REPORT RESUMES

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DIAGNOSING AND CORRECTING INDIVIDUAL DEFICIENCIES IN LEARNING MUSIC, FINAL REPORT.

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THERE IS A DICHOTOMY WHICH EXISTS IN EDUCATION AND--IN PARTICULAR, IN THE DOMAIN OF MUSIC LEARNING--IN THE ASSUMPTION THAT INDIVIDUAL DIFFERENCES IN LEARNING ARE MET IN A LARGE GROUP-INSTRUCTION PROGRAM. THE MAIN OBJECTIVE IN THE RESEARCH WAS TO TEST AND TO EVALUATE A CLINICAL TYPE OF INSTRUCTIONAL PROGRAM BASED ON INDIVIDUAL DIFFERENCES IN SUCH A MANNER THAT DIAGNOSES COULD BE MADE AND INDIVIDUAL'S MUSIC AILMENTS COULD BE TREATED IN LEARNING THREE BASIC MUSIC ELEMENTS. PHASE I WAS AN ITEM ANALYSIS OF STUDENT WORKSHEETS AND TEST PAPERS ACCUMULATED FROM USING AUTO-INSTRUCTIONAL METHODS IN PAST RESEARCH. PHASE II WAS A DISCRIMINATIVE ANALYSIS SO THAT PREDICTIONS COULD BE MADE FOR THE SELECTIVE AUTO-INSTRUCTIONAL TREATMENT OF INDIVIDUALS. PHASE III WAS AN EXPERIMENT USING THOSE FRESHMEN MUSIC STUDENTS WHO WERE ENROLLED IN THE FUNDAMENTALS OF MUSIC COURSE AT THE OHIO STATE UNIVERSITY IN THE ACADEMIC YEAR 1966-67. FROM THE RESEARCH IT WAS POSSIBLE TO DISTINGUISH INDIVIDUALS AND GROUPS AS A PARTICULAR TYPE OF LEARNING PROBLEM, WHICH COULD BE DEALT WITH ON AN INDIVIDUAL-GROUP BASIS, WITH THE PREDICTED GAIN SCORES ESTABLISHED. (AUTHOR)

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U. S. Department of Health, Education, and Welfare

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The Chio State University Research Foundation Columbus, Ohio 43212

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March 31, 1968

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INTRODUCTION

Historically, educational and psychological research studies investigating classroom instruction have been oriented toward group research. There has been a tradition of group research established which includes such variables as class size and homogeneous groupings. New research has been directed toward the development of new taxonimies of learning as well as new technologies in the field of education. Similarly, testing programs have been designed to measure certain learned skills, capacity for learning, and/or acquired knowledge of the individual. These testing data when reported emphasize group characteristics. Instruction and techniques involving various media have been researched and evaluated, the data reported either show no significant difference or show the gains for group learning achieved by new procedures to be higher than achievements made by students in a traditional classroom approach. Group presentations of these new approaches have been standardized, and despite a reported significant improvement or no significant difference in learning, the variance reported in the learning among students would be expected to be as great as the variance in learning which exists in the traditional classroom.

Individual differences exist as a large source of variance in reported data. To date, there seems to be no research which has found a single method that is universally successful and meets the needs of individual differences. A contextual research program at The Ohio State University for the past three years has investigated the differential effects of twenty-seven auto-instructional methods. During this time the accumulated data and experiences of students observed indicate a next step in research was needed to meet the challenge of learning. The next step was to use existing data and researched auto-instructional methods in a different manner. Even though the researched auto-instructional methods have improved learning, there was no evidence to support the position of a single best method. There was evidence to suggest the possibility that measurable individual differences were important in the learning or not learning of an individual by a particular method. It appeared, therefore, that a new kind of strategy was needed to attack the problem of improved learning for all. Individual differences which could be measured could be utilized. Educational ills must be individually diagnosed. A spectrum of relevant research-proven differential treatments must be available.



Even though much has been said about meeting individual differences in education, little attempt has been made to use measurable individual differences to provide tailored instructional programs to meet the individual needs.

There is a need to develop a diagnostic testing and instructional program which incorporates differential treatments that are geared to the individual differences of students and will give these students a predicted assurance of optimal learning. Since present teachers have neither these kinds of data or instruments, the testing-instructional programs must be ones which can be codified and are economically and generally feasible.

RELATED RESEARCH

Although there has been considerable research undertaken to explore human learning, there is little evidence in the research literature that any attempts have been made to pair individual differences to achievement in learning except after the fact. The recognition of individual differences has been reported when these differences exist only as a source of variance in a statistical analysis of research data. To date no teaching machine and/or program for learning appears to be adequate for meeting the needs of all students (Coulson and Silberman, 1961), (Campbell, 1963). There is some indication (Krumboltz, 1964) that even the difference in effective learning brought about with a verbal program in which some students made a required response and other students were not required to make a response might be due to individual differences.

For ten years, an organized program of research in music learning has been in progress at The Ohio State University. Spohn (1959) reported an experiment in music learning in which a self-presentation technique was used. Information was presented aurally on magnetic tape and students wrote their responses. When the experimental group's achievement was compared with the achievement of a control group using traditional instruction, the experiment group showed a significant improvement in their learning of the material. A refinement of this technique, based on a paired-associate procedure, was reported (Spohn, 1962) using different subject matter for learning. Again the data showed significant improvement in the groups' learning.

In both studies, however, even though all students made improvement some students did not achieve optimal learning. In an attempt to research this problem further, the learning of three basic music elements using four different methods was investigated (cf. Film made pursuant to a contract with the U. S. Office of Education, "Self-Teaching of Music Fundamentals", The Ohio State University MCMLXIV, Charles L. Spohn). Spohn and Poland (1964) reported the differential effects of aural or visual presentation of learning basic music materials when students used either written or voice responses. Spohn (1965) reported that the students, even though trained differently, showed a great amount of transfer to like tasks. In each of the experiments the kind of response which students made was statistically significant to their learning; however, the manner in which information was presented was not significant. An additional finding (Spohn and Poland, 1964) was that the background factors which included various aspects of specific music training, as well as general education, have significant influences upon the students learned behavior. The individual differences (other factors) were significant in each experiment.

A further extension of this research was continued (Spohn, 1965c). The first phase of the research investigated the differential effects of six additional auto-instructional methods for learning each of three basic music elements. Spchn (1964) reported group gains from one of these experiments. The data indicated one method out of six is superior for learning a basic music element by some students, while not as effective for others. On the other hand, group gains in all instances improved. Once again, however, it is observed that individual differences (other factors) did, in fact affect individual outcomes. The data from the continued research (Spohn, 1965c) gave further support to the earlier findings.

An extensive testing program has been developed and used over a period of ten years (Poland, 1960) for the selective admission of students to the music curricula at The Ohio State University. Some of the refinements and use of this testing program for the research program at The Ohio State University are reported in An Evaluation of Two Methods Using Magnetic Tape Recordings for Programed Instruction in the Elemental Materials of Music (Spohn and Poland, 1964, pp. 27-37). The test data to date have been used primarily as an instrument for the selective admission of students into the music curricula. In addition, it has been a routine procedure to use these tests in all relevant investigations because their use forms a common statistical reference base.



OBJECTIVES

The main objective in the research was to test and evaluate a clinical type of instructional program for diagnosing and treating individual basic music ailments. This main objective can be broken down into three specific objectives:

- 1.- to determine from a further analysis of data from past research sponsored by the U. S. Office of Education (which evaluated only differential effects of twenty-seven auto-instructional methods) individual student error patterns and work scores and classify these by method and individual characteristics;
- 2.- to establish a system for diagnosing students basic music learning ailments and predicted from an existing spectrum of differential auto-instructional methods the needed treatment for a given set of individual characteristics;
- 3.- to undertake an experiment with a group of students so that an evaluation of this clinical type of instructional program can be made.

METHOD

There has been a large quantity of data accumulated from both the testing program and the auto-instructional research program which goes beyond the original intent of either. It was believed, therefore, that the test data and the data from the immediate past three years auto-instructional research program in music could be used to provide the basis for the selective educational treatment of individuals to learn music.



¹Background information and test data include: American College Test, Music Skill and Information, General Music Information, Music Recognition, Basic Elements of Music Test, Pretest and Posttest for Basic Music Skills, Age, Sex, Applied Music Performance Area, and Applied Music Audition Grade (cf. Spohn and Poland, 1964, p. 36; and Spohn 1963c, pp. 24, 69 and 104).

²Student worksheets and tests from OE Grant Number 7-34-0430-172,

<u>An Evaluation of Two Methods Using Magnetic Tape Recordings for Programed Instruction in the Elemental Materials of Music and OE Grant Number 7-45-0430-214, A Comparison Between Different Stimuli Combined with Two Methods for Providing Knowlege of Results in Music Instruction.</u>

<u>Procedure</u>. The work plan for the research was carried out in three phases.

Phase I

1.- Phase I was an item analysis of student worksheets and test papers accumulated from past research³, which investigated the differential effects in learning three basic music elements by using nine auto-instructional methods (cf. Figure 1). This is a total of twenty-seven methods.

Figure 1

Basic Music	M	usic A	uto-In	struct	ional (freatm	ent		
Element	1	2	3	4	5	6	7	8	9
A Rhytha									
B Interval									
C Tone Group									

2.- Code and develop a scoring procedure from the item analysis which will result in a total workscore for each student which could be used in an existing statistical program and could be used in the prediction portion of this study.

Approximately 450 students had been through the instructional program. These data were a large source of information. Item analyses (even though considered raw data) of these kinds of materials provide information about individual errors and learning patterns that were not available through more sophisticated statistical analyses. However, even coding and scoring did not make their use in statistical analysis possible.

Phase II

1.- Phase II was a discrimination analysis, using data from the past three years' research (cf. footnote number 1) and work-scores from the item analysis, step 2, Phase I, to predict and thereby to provide for the selective educational auto-instructional treatment of individuals to learn three basic music elements by means of the existing spectrum of auto-instructional methods shown in Figure 1. In Figure 2, it is possible to observe the various relationships between the categorization of individual characteristics, basic music elements, and auto-instructional treatments. An illustration of this procedure might be as follows (cf. Figure 2):

Figure 2

		Class	ificat	tion o	f Indiv	vidual	Chara	cteris	tics	
		$\left \right ^{2}$	\int_{-3}^{3}	3	4 / 5	6	7	8	9	
Basic		AU	TO-IN	STRUCT	IONAL 7	REATM	ENTS			
Music Elements	I	II	111	IV	v	VI	VII	VIII	IX	
A Rhythm										
B Interval										
C Tone Group										

A general individual characteristic classification might be one in which those girls who have had private piano instruction (cell 1) show the most improvement in learning the basic music element, rhythm (cell A) using autoinstructional method I, which incorporates an aural presentation-written-response and visual knowledge of results. This provides the basis for Phase III.

Phase III

Phase III was a three-part experiment. The sample used in this study consisted of those Freshmen who were enrolled in the fundamentals of music course at The Ohio State University in the academic year 1966-67 (approximately 130 students).

These students, upon entry to the fundamentals of music class in the autumn of 1966, were given tests³ (Spohn and Poland, 1964) referred to in Phase II, number 1.

On the basis of the data obtained from Phases I, II, and the test data, Phase III, students' music educational malady was diagnosed and these students were assigned the appropriate predicted auto-instructional treatment(s) to achieve optimum learning, Figure 2. It should be noted, however, that the possibility existed that all cells shown in Figure 2 would not be used. This, of course, depended upon the outcome of the analyses. (cf. Film made pursuant to a contract with the U.S. Office of Education, "Self-Teaching of Music Fundamentals", The Ohio State University MCMLXIV, Charles L. Spohn, for an example of some of the auto-instructional methods.)



RESULTS AND FINDINGS

In each of three quarters, a group of approximately 130 students was divided into three groups, each of which was given a particular type of music training (cf. Appendix B). In each quarter each student was tested on the three aspects of the training, even though he was subjected to only one of them. Both the training groups and the tests are designated A, B, C. In summary:

Groups or tests	Autumn-Rhythm	Winter-Intervals	Spring-Tone Groups
A	Single tone	Ascending	Ascending
В	Series	Descending	Descending
С	Taps	Harmonic	Ascending/Descending

At the beginning of each quarter, all students took the three tests A, B, C. These will be referred to as the initial tests or pretests. On the basis of these initial tests, the students were divided into three groups A, B, C. An attempt was made to balance the high, medium, and low initial scores in the three groups. In the Winter and Spring Quarter the additional criterion of splitting up the groups from the previous quarter was also invoked. It is believed that the resulting groups were as balanced on initial scores as possible.

Three tests A, B, C, were administered to all the students at the end of each quarter. The difference between the posttest and the pretest will be called the gain score. In the Autumn Quarter the maximum possible score on a test was 100. The percentage gain score in this case would be (Gain Score)/(100 - Pre-Score). For the Winter and Spring Quarters the maximum scores were 64 and 36. For those quarters the percentage gain scores were Gain/(64-pre) and Gain/(36-pre), respectively.

Tables I-V give the means, standard deviations and correlations for the Initial Scores, the Gain Scores and the Percentage Gain Scores. Note that for Autumn the scores are also divided into Duple, Tripe and Duple-Triple combined.



Table I

Means, Standard Deviations and Correlations for the Initial Scores, the Gain Scores, and Percantage Gain Scores for Autumn Duple Rhythm Only

			. 3			*	enderd D	Standard Devistions	6			Correlat tons	t tons	
Group	c	A 42	95 P	c4	Total 131	\	e e	ပ	Total	Var. Pair	<	es.	ပ	Total
Initial Test	∢ ≈ ∪	15.619 20.571 24.810	14.000 20.000 23.413	14.163 20.953 25.256	14.573 20.491 24.466	15.329 18.213 18.912	12.931 16.484 17.134	11.918 17.942 18.495	13.357 17.402 18.044	A-0 0-6	.93 .88 .97	.92 .88 .97	.91 .88 .95	.92 .87
Ge in	< ∞ ∪	36.000 29.619 28.095	33.348 31.935 28.065	36.488 30.349 28.791	35.229 30.672 28.313	13.826 14.872 14.459	13.020 13.647 13.531	13.943 16.070 16.660	13.555 14.785 14.802	A - C - C	.90 .76 .88	.69 .90	.81 .72 .89	. 79 . 71 . 89
Getn 64-pre	< ≈ ∪	. 779 . 696 . 754	.692 .748 .711	. 727 . 751 . 751	. 738 . 725 . 738	.214 .281 .249	.235 .191 .216	.237 .243	.230 .239 .245	₩ C C	. 68 . 76	77.	.90 .81	47. 47. 87.

Table 11

Means, Standard Deviations and Correlations for the Initial Scores, the Gain Scores, and Percentage Gain Scores for Atumn Triple Rhythm Only

			Means	81			Standard	Standard Deviation	uo			Corre	Correlations	
Group	c	4 5	97 8	ပ 😽	Total 131	<	æ	ပ	Total	Var. Pair	<	æ	ပ	Tota
Initia]	_ 4	11 605	1000	10 651	\$10.11	15 220	7 700	9	7 000	8-4	8	l a	1	
,	: œ	15.405	12.957	13.674	13.977	18.213	8.246	9.536	8.999	Y -C	. 82	98.		84
	ပ	18.167	15.522	17.558	17.038	18.912	9.993	10.496	10.160	3-C	.93	.91	76.	.92
Gain	⋖	15.905	13.674	15.279	14.916	6.450	6.318	8.113	7,008	A-B	.62	.65	.63	. 59
	6	11.960	14.674	12,293	13,145	6.501	6.360	7.504	6.829	A-C	97.	.62	.67	.57
	ပ	11.143	13.457	11.465	12.061	7.380	8.123	9,305	8.311	B-C	.73	.8	.83	.80
Gein														
36-pre	<	769 .	.559	.631	.626	.250	.229	.283	.258	A-B	.62	.65	.63	.59
	£	.601	999.	. 585	619.	.276	.225	.360	.291	V-C	.71	.51	80.	.21
	ပ	.680	.693	067.	.622	.272	.259	.931	.579	B-C	.53	74	.22	. 32



Table III

Means, Standard Deviations and Correlations for the Initial Scores, the Gain Scores, and Percentage Gain Scores for Autumn Duple and Triple Rhythm Combined

	Meen			S	tendard 1	Standard Devistion	_			Correlations	ions	
1	97 97	c.4	Total 131	<	m	ပ	Total	Var. Pair	۷	m	ပ	Total
27.024 35.976 42.976	25.000 32.957 38.935	24.814 34.628 42.814	25.588 34.473 27.791	22.398 26.428 25.726	19.613 23.253 25.726	18.141 25.332 26.124	19.967 24.826 26.397	A-B A-C B-C	.95 .91	.94 .91	.95 .90 .95	.94. 09. 79.
51.905 41.310 39.238	47.022 46.609 41.522	51.767 43.279 40.256	50.145 43.817 20.374	19.059 19.929 20.017	17.204 17.791 19.347	19.601 20.980 22.149	18.614 19.542 20.379	A-8 A-C B-C	.89 .76 .87	.93	.84 .72 .89	.80 .71 .89
	.648 .721 .710	.711 .685 .716	.702 .698 .721	.219 .244 .224	.209 .185	.233 .234 .271	.223 .221 .236	A-6 B-C	.81	.80 .71 .85	.87 .75 .86	.79

Table IV

Means, Standard Deviations and Correlations for the Initial Scores, the Gain Scores, and Percentaga Gain Scores for Winter Interval

												Correl	Correlat tons	
			Means			1	tenderd	Standard Deviations	10101	Var	 	B	ပ	Total
Group	E	43 43	B 37	25 32	Total 112	∢	n	٥		Pair				
														;
Initial Test	< ∞	11.116 9.233	10.000	10.500 9.813	10.571 9.402 6.241	6.123 6.252 4.928	6.110 6.130 6.296	6.263 6.591 5.949	6.121 6.259 5.673	A-B B-C	48. 66. 7.	.87 .79 .89	88. 88.	. 86 . 75 . 84
	ပ	7.60.0			•				•	(3	7.0	ç	577
Gein	≪ ∞	8.000	5.649	4.531	6.232	3.988	3.395	4.204 3.514 7.44	4.243 3.741 3.898	¥ V •	32	04. 46.	.37	13
	Ö	2.651	2.757	4.188	3.125	3, 301	3.002							
Gain 24-pre	< ∞	.668	.480	.256	.354	.259	306.	.512	.396 .335	A-6 A-C	90. 10.	.71 .68 .66	.33	.30
	ပ	. i 77	.217	.262	C12.									

.

Table V

Means, Standard Deviations and Correlations for the Initial Scores, the Gain Scores and Percentage Gain Scores for Spring Tone Groups

			sue ay.				Standard Deviations	Deviati	ons			Corre	Correlations	
Group	E	A 39	35 35	29	Totel 101	V	æ	၁	Total	Var. Pair	<	æ	ن	Total
Initial Test	∢ ∰ ∪	11.538 12.538 7.436	12.000 11.943 6.971	12.222 13.074 8.037	11.881 12.475 7.436	9.703 11.914 10.550	10.102 10.849 9.460	10.382 11.069 8.825	9.929 11.226 9.651	A-B A-C B-C	. 94 . 82 . 87	. 96 . 94 . 91	.92 .81	. 93 . 85
G a t n	∢ ໝ ∪	8.436 3.872 4.452	7.000 8.143 3.029	5.333 3.481 6.333	7,109 5,248 4,465	7.130 5.850 6.832	5.641 8.012 3.937	4.772 7.138 7.835	6.132 7.252 6.374	A-3 A-C	.50 .39 0r.	.03 .03	.58 .40	.31
Gain 48-pre	< p ∪	.281 .094	,227 ,253 ,087	.204 .111 .178	,241 ,156 .126	.263 .286 .236	.195 .242 .131	.232 .312 .235	.233 .286	A-8 A-C B-C	.33 .43 15	.33 .33	.57	90.

Preliminary Analysis

The first question to be raised regards the relevancy of the music scores, MSI, GI, MR. To answer this an analysis of variance on the groups A, B, C, with the pre (or initial) score and the scores MSI, GI, MR in covariance was carried out. This was done on the Duple A, B, C, A+B+C and Triple A, B, C, A+B+C gain scores for the Autumn Quarter. Some of these results are summarized in Table VI The first F in the table tests the hypothesis that the coefficient of the pre score was always significantly different than zero. The F's (with one exception) for the variables MSI, GI, MR were generally small. It was decided at this point to ignore these measurements in subsequent analyses.

The average effect of a particular type of training, i.e., groups A, B, C on students in the Autumn Quarter on students training in the Winter Quarter was minimized by distributing the students, say, in the Autumn A group over all three groups in the Winter Quarter. The same was done in the Spring Quarter relative to the groups in the Winter Quarter. An analysis of variance was carried out to see whether the preceding group division was important. In particular, a given student could be classified Autumn A, B, C, and Winter A, B, C and the effects of these classifications as well as contains the F's that their interaction was studied. Table VI test whether the effects of these classifications are zero on the gain scores A, B, C and A+B+C. This analysis was carried out for both Winter-Autumn and Spring-Winter. Only students that were present both quarters were used. In all cases the interaction of the two quarter classifications was not significant as well as the effect of the previous quarter classification. This result justifies -- to some extent at least -- analyzing the scores for each quarter separately.

Comparison of Group Means

Since the three tests A, B, C are correlated, the hypothesis of no differences in the training groups was tested in a multi-variate analysis of variance. For each quarter the following array exhibits the means:



Table VI
Results of Preliminary Analysis

F's for testing hypotheses that certain given variables have no effect in the regression of the gain scores on these variables.

		Autumn Quarter (n	= 128)	
	Gain Score	Group A,B,C	MSI,GI,Mr	
Duple	A	1.31	3.05*	
	B C	.30	1.34	
	C	.50	2.05	
	A+B+C	.21	1.54	
friple	A	1.85	.45	
	В	1.22	.96	
	С	.24	. 76	
	A+B+C	.03	.49	
		Winter Quarter	(n = 106)	
	Gain Score	Autumn Group A,B,C	Winter Group A,B,C	Autumn and Winter Group Interaction
	A	2.47	14.08**	1.20
	В	1.01	2.18	.64
	С	2.21	.70	1.16
	A+B+C	2.00	1.97	1.32
		Spring Quarter	(n = 97)	
	Gain Score	Winter Group A,B,C	Spring Group A,B,C	Winter and Spring Group Interaction
	A	2.00	3.48*	0.26
	В	1.49	3.92*	1.53
	_			
	č	.60	2.31	.36





<u>Test</u>	Group A	Group B	Group C
A	\mathbf{AA}^{m}	^m AB	^m AC
В	^m BA	^m BB	^m BC
С	^m CA	^т СВ	^m cc

The null hypothesis to be tested is that simultaneously

$$m_{AA} = m_{AB} = m_{AC}$$
 $m_{BA} = m_{BB} = m_{BC}$
 $m_{CA} = m_{CB} = m_{CC}$

For a given group the three test scores give rise to a variancecovariance matrix. As an example, refer to Table VII, Autumn, first page, the first entry 363.2590 is the sample variance for group A on the gain A score. The square root of this number is 19.059, the standard deviation found in Table I. Similarly, 397.1458, 400.6736 are the variances of the gain B and gain C scores in group A. The 338.64 is the covariance of the gain A and gain B score. The correlation of A and B could be obtained by dividing the covariance by the two associated standard deviations. Briefly, the variancecovariance matrix for a group contains information about the variability of the scores and their interdependence. Tables VII-IX contain these matrices (the lower half was not typed for convenience) for each group and for the entire group for both the gain scores and percentage gain scores. One should note that in the separate groups the variances and covariances are computed about their respective means whereas in the entire group the variances and covariances are computed about the means of the entire group. Intuitively, then, if the null hypothesis is correct, one would expect that the average (Table X) three group matrices would resemble the matrix for the entire group.

Table VII

Variance-Covariance Matrix
for Autumn Rythm Study

Variance-Covariance Matrix for Gain Scores

n	<u>Variable</u> A	B	, c
42	363.2590	338.6400	290.3403
		397.1458	348.7782
			400.6736
46	295.9773	225.4531	230.2995
			319.2976
			374.299
63	384 1827	345 5644	311.3228
43	304.1027		411.5698
•	•	440,1304	490.5759
			490.373
131	346.4634	291.6883	269.891
		381.9046	355.5693
			415.3129
•	42 46 43	42 363.2590 46 295.9773 43 384.1827	42 363.2590 338.6400 397.1458 46 295.9773 225.4531 316.5101 43 384.1827 345.5644 440.1584 131 346.4634 291.6883

	Variance-C	ovariance Matrix for	Percentage Gain	
		(<u>Gain</u>) Scor	re s	
Group	n	•		
A	42	.047977	. 043499 . 059443	.040390 .042088 .049996
В	46	.043530	.030767 .034347	.031848 .033998 .046287
С	43	.054346	.047507 .054969	.047165 .054906 .073392
Total	131	.049559	.039029 .048698	.039455 .042640 .055644

The season of the season of the

Table VIII

Variance-Covariance Matrix for Winter Interval Study

Variance-Covariance Matrix for Gain Scores

		<u>variable</u>		
Group	n	A	В	С
٨	43	15.9048	7.16667 16.7265	4.21429 -0.209302 10.8992
В	37	15.0676	6.49700 11.5285	5.71772 4.20946 13.4114
c	32	17.6764	7.81956 12.3458	9.34879 6.14315 22.4153
Total	112	17.9997	7.15669 13.9971	2.09685 2.65541 15.1914

Variance-Covariance Matrix for Percentage Gain

(Gain) Scores

A	43	.0672117	.0055595 .14 0 6818	.0053699 0012657 .0609746
В	37	.092294	.0658843 .0934443	.0618972 .0603733 .0907351
С	3?	.2617364	.0632183 .0750453	.0787814 .0211080 .2154790
Total	112	,1565632	.0400169 .1123472	.0382923 .0252044 .1138819

Table IX

Variance-Covariance Matrix for Spring Tone Group Study

Variance-Covariance Matrix for Gain Scores

		Variable		
Group	n	A	В	С
A	39	50.8313	20.8731 34.2200	19.1883 11.9555 46.6761
В	35	31.8235	?9.0294 64.1849	5.64706 0.966386 15.4992
С	27	22.7692	19.6795 50.9516	15.000 11.5256 61.3846
Total	101	37.5980	22.9428 52.5881	12.2688 5.5237 40.6 3 13

Variance-Covariance Matrix for Percentage Gain

· 60		(Gain) Sec	ores	
A	39	.0692633	.0247994 .0821998	.0264859 0100989 .0554653
В	35	.0380188	.0320386 .0588118	.01 54 569 .0103967 .0171959
С	27	.0536267	.0412265 .0970355	.0329123 .0217169 .0554281
Total	101	.054?390	.0300 4 67 .0817639	.0235349 .0034158 .0426051

Table X

Composite Variance-Covariance Matrices

Quarter	Variable	n	A	В	c
Autumn	Gain (Comb)	131	347.8063	303.2198 384.6048	277.3209 359.8819 421.8497
	ZGain (Comb)	131	.0386173	.0304909 .0394862	.0298010 .0436643 .0565584
	Gain (Duple)	131	185.0301	163.0421 221.8804	146.0189 198.0947 223.2329
	%Gain (Duple)	131	.0523476	.0424197 .0581728	.0416446 .0474268 .0610623
	Gain (Triple)	131	49.11301	35.14356 46.63397	34.80829 44.97801 69.01397
	%Gain (Triple)	131	.0549563	.0467777 .0854206	.0332100 .0521704 .3361826
Winter	Gain	112	16.21625	7.16107 13. 5 33 5 9	3.61741 3.38110 15.57532
	%Gai n	112	. 1404158	.0448874 .1030571	.0486828 .0267385 .1223962
Spring	Gain	101	35.14135	23.19401 49.78547	13.27844 8.14917 41.18663
	%Gain	101	.0536363	.0326882 .0793490	.0249517 .0073382 .0426964

The likelihood ratio test of the hypothesis is based on this idea and is, indeed, determined by the ratio of the determinants of these matrices. These $D_{\rm C}/D_{\rm a}$ ratios are tabulated in Table XI The exact distribution of this ratio is known and the probability associated with this ratio is also given in Table XI. In all cases the hypothesis may be rejected, i.e., differences exist among the groups on the gain scores and on the percentage gain scores.

Since Test A is over the training received in group A, Test B over that in group B, Test C over that in group C, one might expect that the means m_{AA} , m_{BB} , m_{CC} would be the largest in their respective comparisons. Except for Test C in the Autumn Quarter this was the case. This fact combined with the above test of significance would lead to the conclusion that the training was at least effective in raising the score in that particular area.

The use of the percentage gain score allows one to compare the A, B, C scores within a group. No test of significance was carried out here but one can observe that in the A group the percentage gain for the A score was the largest, in the B group the percentage gain for the B score was the largest, but that there was no consistency for the C group.

Analysis of Gain Scores as Related to Groups and Initial Scores

For each of the gain scores the effects of the classifications by groups was studied in an analysis of variance with the three initial scores in covariance. The results are given in Table We shall look at the first one as an example. The gain in A (duple + triple) is given in a multiple regression form by

gain in
$$A = -1.200$$
 (pre A) + 0.1051 (pre B) + 0.579 (pre C)

Thus, the gain in A is greatest if the pre A score is small, the pre B, pre C scores large and one is in group A. The coefficients of the pre A and pre C scores are significantly different than zero.



Table XI
Testing Equality of Means

Quarter	Variable	D _c /D _a	Probability
Autumn	Gain-Duple	.9571	.473
	Gain-Triple	.8783	.0111
	Gain-Duple + Triple	.8906	.022
	% Gain-Duple	.9258	.134
	% Gain-Triple	.9158	.083
	% Gain-Duple + Triple	.8704	.007
Winter	Gain	.8271	.002
	% Gain	.7937	.0003
Spring	Gain	.8266	.005
	% Gain	.8755	.045
	Selected Group	p	
Autumn	Gain Duple	.9139	.076
Autumn	Gain Triple	.9174	.090
Autumn			
Autumn	Gain Triple Gain Duple + Triple Z Gain Duple	.9174 .8664 .8033	.090 .021 .0001
Autumn	Gain Triple Gain Duple + Triple Z Gain Duple Z Gain Triple	.9174 .8664 .8033 .8991	.090 .021 .0001 .035
Autumn	Gain Triple Gain Duple + Triple Z Gain Duple	.9174 .8664 .8033	.090 .021 .0001
Autumn Winter	Gain Triple Gain Duple + Triple Z Gain Duple Z Gain Triple	.9174 .8664 .8033 .8991	.090 .021 .0001 .035
	Gain Triple Gain Duple + Triple Z Gain Duple Z Gain Triple Z Gain Duple + Triple	.9174 .8664 .8033 .8991 .7860	.090 .021 .0001 .035 .0003
	Gain Triple Gain Duple + Triple Z Gain Duple Z Gain Triple Z Gain Duple + Triple Gain	.9174 .8664 .8033 .8991 .7860	.090 .021 .0001 .035 .0003

In the Winter and Spring Quarters the regressions are rather consistent in that the gain in a score is greatest if the same pre score is least and if the training corresponding to that score is used. A few cases counter to that occur in the Autumn. Furthermore, the groups exhibit more significant differences in the Winter and Spring as opposed to the Autumn. The use of these regression equations as predictors will be examined, as follows.

Prediction of Gain Scores from Initial Scores and Training.

The regression equations given in Tables XII-XIV enable one to predict the mean gain score or the mean percentage gain score for an individual with known pre scores and group assignment. It must be borne in mind that the leeway (or error) involved in such a prediction is determined in great part by the standard deviation. This value is given under σ in Tables XII-XIV and it is immediately evident that the prediction of an individual's score is not very accurate. It is better to think of the prediction of the mean of a group of students rather than of an individual student.

Using the mean pre scores from Table I we shall label an individual as average (A) if his pre score is the average of the total group; we shall label him as low (L) if his pre score is one standard deviation below the mean and as high (H) if his pre score is one standard deviation above the mean. For example, in the Autumn on score A a student is A, L, or H if his initial test is 25.588, 5.621, or 45.555. Using this classification on each initial test, i.e., A, B, C we obtain 27 different "types" of individuals. For each of these types, the predicted mean for each of the three scores is given in Tables XV-XX. This has been done for each quarter and for both gain and percentage gain scores. These tables show the effects of the pre scores, effects which can also be seen directly from the regression coefficients in Tables XII-XIV. The changes from group to group are also evident from Tables XII-XIV.

The Difference between the Post and Pre Scores

The difference between the post and pre scores is the basic measurement in assessing differences among the treatment groups. The analysis of these gain scores is made more precise by taking out the effects due to initial scores in the analysis of covariance. In

Table XII
Regression Coefficients for Gain Scores on Pre Scores and Groups
Autumn Quarter

ייייייייייייייייייייייייייייייייייייייי		rre			Group			
Variable	∢	F Q	ပ	∢	Ø	ນ	Const.	•
Duple + Triple								
Getn - A	-1,200*	0.1051	.5790*	2,402	-2.252	150	136 15	15 750
~	3168	9436*	*9901	-1,592	3.073	-1.481	55 042	15 118
ပ	2451	03067	3277*	- ,2508	.1200	1308	61.297	15, 112
Total	-1.532*	863	.736	1.109	.757	352	17.516	45.719
Duple A	*	.0212	*85/7	1.657	-2.037	0,380	38.680	11, 35,
#		_	.6403*	-1,0083	1.3523	-0.3440	39,474	10,888
ນ			4803#	.0548	8566	8018	42,438	10.561
Total	-1,316*	-1.131	.653	. 569	-1.348	.779	120.654	31.574
Triple A	-1.03197#	.3893*	.23998*	.4773	5834	+ .1061	757.6	S 878
æ		5578*	*3009 *	8769	1.4528	5759#	7508	5,635
ပ	1254	. 2903	7081*	9997	.6341	- ,1675	3800	6,131
Total	-1.292*	.387	551	9920	1912	.2678	57.552	18.700
Duple + Triple								
Z Cain - A		•	.005003*	.04201	03959	00242	.50271	.1800
n U	0045357	001162	.009533*	01487	.04160	02673	.52679	1959
Total Duple	01083		.01962*	0,111		04221	16.338	.5614
Z Gain - A	002874	.001133	.007238*	.03941	- ,04108	79100	58130	,001
	005869	007131	.014144*	02551	.03215	79900	2196.	. 1967
ပ	002607	0007434	.004997	01603	02384	.0077	05047	577.
Total Triple	01135	-,00674	.02638*	.02994	03282	.00288	1.8601	.6152
V	01369*	.01881	.005477	.03928	06090	+ .00162	82128	2102
~	01475*	.0005656	.01666*	0300	.0753	- 0453#	7873	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
ပ	02222	.02683	009582	.0412	0.846	12584	5635	7777
Total	477040						6660	

Table XIII
Regression Coefficients for Gain Scores on Pre Scores and Groups
Winter Quarter

	0	3.407	3.554	. 3585	. 7199
		616	e. w		
	Const.	9.618	1.255	4154	.7221
	ပ	-1.664# 762#	1,146*	- ,2218*	. 2598*
Group	£	658	261	.0056	.1392
	V	2,322	1.516	.2162	.0409
	ပ	.04388	-,4394*	. 014990	.001874 -,001874 .03854*
Pre	s o	.2119*	.2191	.005163	01325 .021100* .01301
	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	5536#	.05661	008929	.00467
	4	< •	9 0	∢ :	n U
	Dependent Variable	G e fn	Total	% Gein	Tote1

Table XIV
Regression Coefficient for Gain Scores on Pre Scores and Groups

Dependent Variable	ų	V	s a	U	V	20	ပ	Const.	0
Ge in	<.	-,3306*	.3101* 8588*	.2116*	1,390	0.390 2.649	-1,780#	5.398	5.587 6.210
Total	a U	. 63394	2439#	0757 0758	. 388	-1.855 1.207	+1.797 * -1.595	10.192	13.830
% Gein	< •	001289	.010702* 02880*	.007921*	.04310	.09000	04299#	.05921	.1507
Total	ပ	.01774*	.00791	01656* .00768	.00073	04837	. 04764*	.12496	. 4246

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TABLE XV Predictions of Gain Scores Based on Given Individual Group Pre Test Scores for Duple and Triple Rhythm

			3	Dead	Deadicted Cain	Score	Predic	Predicted Gain	Score	Total	1 Predicted	5
Pretest	Ξ	Predicted Gain Score	ain score	for			for		C	3	Cain Score	
Score		TOL VALLEDIE	V BIQ	2		,	-	•	U	<	2	ပ
Group	V	9	ပ	V	200	16 16	30.05	30 37	30.38	90.54	90.92	88.48
臣	38.94	34.29	36.39	71.60	07.07	17.17	8.00	000	30	65.20	65.58	63.14
HHA	23.63	18.98	21.08	2.86	7.52	76.7	38. /1	90.66	60.6	30.00	70 07	37,80
H	8.32	3.67	5.17	-15.88	-11.32	-15.77	47.42	47.19	08.74	99.66	17.04	70 001
HVH	36 21	31,56	33.66	76.44	69.60	45.05	30,74	31.11	31.12	111.90	07.711	00.00
144	20.00	16.25	18 35	26.20	30.86	26.31	39.46	39.83	39.84	86.55	86.93	80.49
5 4 5	20.70	70	7	7.46	12,12	7.57	48.17	48.54	48.55	61.21	61.59	59.15
1	72.60	20.00	30.02	68.27	72.93	68.38	31.49	31,86	31.87	133.24	133.62	131.18
	30.40	12.63	15.62	700	56 19	79 67	40.20	40.57	40.58	107.90	108.28	105.84
_	10.17	13.32	13.02	30 70	35. 45	30.90	16.87	49.28	29.29	82.55	82.93	80,94
	200.7	50 26	36 36	27 00	32.65	28.10	34.99	35,36	35.37	125.89	126.27	123.83
_	14.20	70.20	76.50	0 25	13 91	92.0	63, 70	46.07	44.08	100.55	100.93	67.86
	2000	77.63	20.73	67.0-	-4 R3	-0.38	52.41	2.78	52.78	75.20	75.58	73.14
	07.70	65.73	67.63	51 23	25.00	51.44	35.74	56.11	36.11	147.24	147.62	145.18
_	11.00	20.00	20.75	32 50	27 25	32 70	57 77	44.82	44.83	121.90	122.28	119.84
	3	17.04	10.75	12 85	18 51) ! <u>"</u>	51,16	53,53	53.54	96.56	76.96	94.50
	23.23	06.42	30.73	74. 67	70.77	, 7 27	36.48	36.85	36.86	168.59	168.97	166.53
_	01.44	37.79	20.50	55 02	50.58	56 03	62.19	45.56	45.57	143.25	143.63	141.19
	61.24	22 17	76.96	37.18	41.84	37.29	53.90	54.27	54,28	117.90	118.28	115.84
100	20.02	82 22	CL 78	36 38	39.04	34.49	39.98	40,35	40.36	161.24	161.62	159.18
1.04	71.56	66 91	10.09	15.64	20.30	15.75	48.70	49.07	80.67	135.89	136.27	133.83
	56.25	51.60	53.70	-3.10	1.56	-2.99	57.41	57.78	57.79	110.55	110.93	108.49
HVI	75. 25	67.62	81.59	57.72	62,38	57.83	40.73	41.10	41.11	182.59	182.97	180.53
	68.83	81.49	66.28	38.98	43.64	39.09	77.67	18.67	49.82	157.25	157.63	155.19
Í	52.53	48 86	20.96	20.24	24.90	20.35	58.15	58.52	58.53	131.90	132.28	129.84
	17.10	76.76	78.86	81.06	85.72	81.17	41.47	41.84	41.85	203.94	204.32	201.88
41.	76.10	77.19	63.55	62,31	66.97	62.42	50.18	50.55	50,56	178.59	178.97	176.53
9 :	30.10	46 13	48.23	43.57	48.23	43.68	58.90	59.27	59.28	153,25	153,63	151.19
1				•			1					

Table NVI

Predictions of Percentage Gain Based on Given Individual Group Pretest Scores for Duple and Triple Rhythm

for Variable A for Variable A for Variable B for Variable C Gain Score 41 0.7115 0.7487 0.6274 0.6839 0.6156 0.7311 0.7109 2.1516 2.1114 7531 0.7115 0.7125 0.4531 0.3648 0.5965 0.5814 0.7869 1.6311 1.5999 1.6311 1.5999 1.6311 1.5999 1.6312 1.6368 0.7869 0.7872 0.7869 0.7874 0.7869 0.7872 0.7869 1.6312 1.6469 1.6312 1.6469 1.1374	A for Variable B for Variable C A<	Pretest Pr	Predicted Gain Sco	Min Score	Pre	Predicted Gain Score	An Score	Pre	Predicted Gain Score	In Score	Total	al Predicted	ted
B C A B C A B C A B C A B C C A B C	B C A B C A B C A B C A B C A B C A B C A C	_	for Variab	le A	3	or Varieb	le B	ŧ	or Variab	le C	8 5	In Score	
0.7115 0.7487 0.6879 0.6136 0.7311 0.7160 0.7039 2.1316 2.1114 1 0.5795 0.5167 0.7356 0.4618 0.4646 0.4646 1.1641 1.0065 0.6437 0.6167 0.7328 0.61823 0.6182 0.7634 0.7483 0.7462 1.0544 0.6286 1.1137 1.0065 0.5050 0.5422 0.6452 0.6286 0.6137 0.6016 1.1339 2.1486 1.1317 1.0065 0.5050 0.4022 0.2617 0.7442 0.6286 0.6137 0.6016 1.1339 1.1317 1.0065 0.7466 1.1346 1.5186 1.1317 1.0065 0.7466 1.1317 1.0065 0.7466 1.1317 1.0065 0.7466 1.1317 1.0065 0.7466 1.1317 1.0065 0.7466 1.1317 1.1317 1.1317 1.1317 1.1317 1.1317 1.1317 1.1317 1.1317 1.1317 1.1317 1.1317 1.1317 1.1317<	0.7115 0.7487 0.6274 0.6839 0.6156 0.7116 0.7160 0.7039 2.1516 1 0.5795 0.6167 0.6274 0.6831 0.3868 0.6367 0.4467 0.6446 0.6466 1.1674 0.5626 0.3357 0.2666 0.7754 0.7846 0.6459 0.6469 1.1339 0.2866 0.7787 0.7744 0.7897 0.6466 0.7774 0.7891 0.7749 0.6469 0.7749 0.7749 0.7749 0.7749 0.7749 0.7749 0.7749 0.7749 0.7749 0.7749 0.7749 0.7749 0.7749 0.7749 0.7749 0.7749 0.7	ĺ	2		٧	•	ပ	٧	•	٥	¥	۵	ا ا
0.5795 0.6167 0.3766 0.4331 0.3648 0.5934 0.5693 1.6344 1.5939 1.6341 1.5939 0.4475 0.6467 0.7634 0.7362 0.7362 1.1167 1.0765 0.6370 0.6462 0.7633 0.7634 0.7467 0.7466 1.1137 0.5030 0.5462 0.7315 0.4442 0.6286 0.6137 0.6167 1.1539 1.1137 0.5300 0.5462 0.2125 0.2617 0.1934 0.4941 0.4796 0.6609 0.7662 0.6476 0.7669 1.1137 0.5305 0.4002 0.8427 0.7734 0.7569 0.6499 0.6469 1.1316 1.516 0.7304 0.7364 0.7849 0.4666 0.7349 0.6489 0.4987 0.7891 0.7891 0.7891 0.7891 0.7891 0.7891 0.7891 0.7891 0.7892 0.7891 0.7892 0.7891 0.7892 0.7891 0.7892 0.7892 1.1912 1.1316	0.5795 0.6167 0.3766 0.4331 0.3648 0.5894 0.5695 1.6341 0.6475 0.6487 0.1238 0.1183 0.6187 0.7467 0.7362 1.1167 0.6370 0.6487 0.6187 0.7462 0.7362 0.7362 1.1167 0.5370 0.5422 0.4660 0.7125 0.4442 0.6286 0.6137 0.6016 1.6714 1.6714 0.5020 0.5022 0.2617 0.1934 0.6496 0.6490 0.6669 1.1539 0.4302 0.6102 0.2052 0.2617 0.1934 0.6106 0.6499 0.6589 1.1539 0.4302 0.761 0.7849 0.5660 0.7841 0.7849 0.6619 0.7419 2.362 0.7244 0.7846 0.7846 0.7846 0.7849 0.6447 0.7426 0.7419 0.7244 0.7849 0.4866 0.7849 0.7849 0.6447 0.7426 0.7419 0.7249 0.7841 0.7859	12	0.7115	0.7487	0.6274	0.6839	0.6156	0.7311	0,7160	0.7039	2.1516	2.1114	2.0682
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0.6370 0.6442 0.7068 0.7633 0.6950 0.7063 0.7069 2.1486 2.1486 2.1486 2.1486 2.1486 2.1486 2.1486 2.1486 0.5132 0.6560 0.5562 0.6560 0.6569 0.1539 0.1534 0.64941 0.6496 0.7490 0.7662 0.2617 0.1934 0.64941 0.7490 0.7662 0.2617 0.7744 0.7957 0.7806 0.7662 1.6748 1.6748 1.6718 1.6769 1.131	0.6370 0.6442 0.7633 0.6950 0.7634 0.7643 0.7362 2.1868 0.5050 0.4422 0.6442 0.6288 0.6137 0.6016 1.6714 0.3750 0.4402 0.2617 0.1934 0.6288 0.6137 0.6066 1.6714 0.3705 0.2627 0.2617 0.7957 0.7862 0.6669 1.7957 0.7669 1.7086 0.7305 0.4305 0.797 0.7796 0.7699 0.7869 0.6113 1.7086 1.7086 0.7305 0.7366 0.7797 0.7749 0.7699 0.6074 0.7749 <td>3</td> <td>0.4475</td> <td>0.4847</td> <td>0.1258</td> <td>0.1823</td> <td>0.1140</td> <td>0.4618</td> <td>0.4467</td> <td>0.4346</td> <td>1.1167</td> <td>1.0765</td> <td>1.0333</td>	3	0.4475	0.4847	0.1258	0.1823	0.1140	0.4618	0.4467	0.4346	1.1167	1.0765	1.0333
0.5050 0.5422 0.4560 0.5125 0.4442 0.6268 0.6137 0.6016 1.6714 1.6312 0.3730 0.4102 0.2052 0.2617 0.1934 0.4790 0.4669 1.1539 1.1137 0.5252 0.2617 0.1934 0.4960 0.7665 0.7666 1.1539 1.1137 0.4305 0.4677 0.5354 0.5919 0.5264 0.5133 1.7086 1.6684 0.7934 0.7046 0.7757 0.7074 0.7649 0.6439 1.1912 1.1510 0.7944 0.7046 0.7757 0.7074 0.7667 0.6717 1.3546 1.2510 0.6574 0.7046 0.7866 0.6072 1.8518 1.1816 1.2510 0.6574 0.7046 0.2346 0.6467 0.6467 0.6467 0.4767 1.3669 1.3669 1.3669 1.3669 1.3669 1.3669 1.3669 1.3669 1.3669 1.3669 1.3669 1.3669 1.3669 1.3669	0.5050 0.5422 0.4560 0.5125 0.4442 0.6286 0.6137 0.6016 1.6714 0.3730 0.4102 0.2052 0.2617 0.1934 0.4941 0.4790 0.4669 1.1539 0.4352 0.2052 0.2617 0.1934 0.4790 0.4669 1.1539 0.4305 0.4667 0.5394 0.5726 0.6610 0.4669 0.7130 1.0132 0.7954 0.4305 0.4566 0.5131 0.4992 1.1912 0.7954 0.7066 0.7757 0.7074 0.7691 0.7440 0.4692 1.1912 0.7249 0.7066 0.7757 0.7074 0.7691 0.7447 0.4726 1.1912 0.5334 0.7269 0.6352 0.7569 0.6447 0.6072 1.8518 0.7249 0.7669 0.6310 0.2442 0.7447 0.4726 1.3465 0.7249 0.7691 0.7869 0.4847 0.6136 0.7445 0.7242 0.7801 <td>2</td> <td></td> <td>0.6742</td> <td>0.7068</td> <td>0,7633</td> <td>0.6950</td> <td>0.7634</td> <td>0.7483</td> <td>0,7362</td> <td>2.1888</td> <td>2.1486</td> <td>2.1054</td>	2		0.6742	0.7068	0,7633	0.6950	0.7634	0.7483	0,7362	2.1888	2.1486	2.1054
0.3730 0.4102 0.2052 0.2617 0.1934 0.4941 0.4790 0.4669 1.1137 1.1137 0.5625 0.5625 0.5627 0.7754 0.7754 0.7957 0.7865 0.2805 1.1085 1.1086 1.6664 0.4305 0.7354 0.2726 0.5413 0.6490 0.6492 1.7086 1.6664 0.7490 0.7893 1.7086 1.6664 0.7741 1.7086 1.6669 0.7419 2.1262 2.1858 0.674 0.7046 0.7464 0.7691 0.7499 0.672 1.8118 1.2162 2.1329 0.674 0.7621 0.7864 0.5494 0.6756 1.6467 0.6756 1.3144 1.2344 1.2346 0.5929 0.6371 0.7869 0.6310 0.4726 1.3344 1.2346 1.3468 0.5929 0.6371 0.3356 0.2863 0.6310 0.6356 0.6310 1.3468 1.3468 0.6504 0.3451 0.3563 0.6563 <	0.3730 0.4102 0.2052 0.2617 0.1934 0.4941 0.4790 0.4669 1.1539 0.5625 0.5827 0.7744 0.7957 0.7865 0.7865 2.2266 0.4305 0.4677 0.5354 0.5216 0.5264 0.5113 0.7065 1.7065 0.2985 0.3357 0.2466 0.5411 0.2726 0.5113 0.4992 1.1312 0.7994 0.7066 0.4664 0.5766 0.5264 0.7849 0.4892 1.1312 0.6074 0.7046 0.5484 0.4896 0.4847 0.7419 2.3692 1.1912 0.6074 0.7021 0.7897 0.8552 0.7869 0.4847 0.4726 1.3344 0.7249 0.7621 0.7897 0.6964 0.5361 0.6976 0.7741 2.3667 0.5344 0.6044 0.5361 0.6967 0.6116 0.7741 2.3667 0.5946 0.6967 0.6516 0.7893 0.6916 0.7893 0.81	9		0.5422	0.4560	0.5125	0.4442	0.6288	0.6137	0.6016	1.6714	1.6312	1.5880
0.5625 0.5897 0.7862 0.8427 0.7744 0.7957 0.7806 0.7805 2.2260 2.1858 2.1858 0.513 0.5136 0.5136 0.5136 0.5136 0.5136 0.5136 0.5136 0.5136 0.5136 0.5138 1.7096 1.7096 1.7096 1.7096 1.7096 1.7096 1.7096 1.7096 1.5192 2.1290 1.1012 1.1316 1.2349 1.7096 1.6094 0.6092 1.1012 1.1316 1.2349 1.2062 0.7149 0.7449 0.7419 </td <td>0.5625 0.5997 0.7862 0.8427 0.7744 0.7957 0.7805 0.7865 0.2366 0.7805 0.7805 0.7805 0.7805 0.7805 0.7805 0.7805 0.7805 0.7805 0.7805 0.7805 0.7805 0.7806 0.7805 0.7807 0.7806 0.7807 0.7806 0.7807<</td> <td>3</td> <td>0.3730</td> <td>0.4102</td> <td>0.2052</td> <td>0.2617</td> <td>0.1934</td> <td>0.4941</td> <td>0.4790</td> <td>0.4669</td> <td>1.1539</td> <td>1.1137</td> <td>1.0705</td>	0.5625 0.5997 0.7862 0.8427 0.7744 0.7957 0.7805 0.7865 0.2366 0.7805 0.7805 0.7805 0.7805 0.7805 0.7805 0.7805 0.7805 0.7805 0.7805 0.7805 0.7805 0.7806 0.7805 0.7807 0.7806 0.7807 0.7806 0.7807<	3	0.3730	0.4102	0.2052	0.2617	0.1934	0.4941	0.4790	0.4669	1.1539	1.1137	1.0705
0.4305 0.4677 0.5334 0.5236 0.5264 0.5313 1.7086 1.6694 0.2985 0.3357 0.2846 0.3411 0.2728 0.5264 0.5113 0.4992 1.1912 1.1510 0.7994 0.8366 0.6464 0.6544 0.6724 0.7499 1.8518 1.1510 0.5374 0.7046 0.5461 0.6344 0.6972 1.3542 1.2342 0.5324 0.7052 0.2176 0.2749 0.4669 0.6486 0.6344 0.6972 1.3344 1.2942 0.7249 0.7621 0.7967 0.8552 0.7669 0.6916 0.4771 2.4055 1.3444 1.2942 0.7249 0.7971 0.3536 0.6316 0.5316 0.4395 1.3463 1.3463 0.5829 0.6301 0.5321 0.6664 0.5361 0.5316 0.4795 1.3463 1.3463 0.5829 0.6304 0.5361 0.5316 0.5316 0.5316 1.3463 1.3463	0.4305 0.4677 0.5354 0.5919 0.5236 0.6610 0.6459 0.6338 1.7086 0.2985 0.3357 0.2846 0.3411 0.2728 0.5264 0.5113 0.4992 1.1912 0.7994 0.6674 0.7046 0.7494 0.7491 0.7369 0.7192	3	0.5625	0.5997	0.7862	0.8427	0.7754	0.7957	0.7806	0.7685	2.2260	2.1858	2.1426
0.2965 0.31357 0.2866 0.3411 0.2728 0.5264 0.5113 0.4992 1.1912 1.1510 0.7994 0.6876 0.6794 0.7340 0.7419 2.3692 2.3290 0.6674 0.7066 0.6864 0.5269 0.6566 0.6993 0.6484 0.5329 1.2942 1.344 1.2962 0.6674 0.7066 0.6664 0.5269 0.6567 0.6726 1.3344 1.2942 0.7249 0.7621 0.7987 0.6663 0.6903 0.4647 0.6736 1.344 1.2942 0.5929 0.6910 0.7862 0.7741 2.4035 2.3663 0.6504 0.6764 0.5653 0.6910 0.5049 1.3164 1.3144 1.3146 0.5184 0.6876 0.6663 0.6936 0.6839 1.3669 1.3647 0.6739 1.3669 1.3166 0.5184 0.6273 0.6836 0.6939 0.6149 0.61493 1.3669 1.3669 1.3669 <td< td=""><td>0.2965 0.3357 0.2866 0.3411 0.2728 0.5264 0.5113 0.4992 1.1912 0.7994 0.6376 0.7757 0.7074 0.7691 0.7540 0.7419 2.3692 0.6574 0.7046 0.6484 0.5193 0.6072 1.8518 0.5354 0.7261 0.2741 0.2058 0.6498 0.4867 1.3344 0.7249 0.7621 0.7787 0.7669 0.6487 0.4776 1.3344 0.5329 0.6301 0.7861 0.6467 0.6316 0.4726 1.344 0.5479 0.6064 0.5321 0.7816 0.5326 0.6395 1.3489 0.6850 0.6316 0.5321 0.5170 0.5395 1.3169 0.6854 0.6376 0.6326 0.6326 0.6326 0.6339 1.3169 0.5364 0.6376 0.6326 0.6326 0.6326 0.6326 1.344 0.5364 0.6376 0.6339 0.6339 0.6339 1.343</td><td>7</td><td>0.4305</td><td>0.4677</td><td>0.5354</td><td>0.5919</td><td>0.5236</td><td>0.6610</td><td>0.6459</td><td>0.6338</td><td>1.7086</td><td>1.6684</td><td>1.6252</td></td<>	0.2965 0.3357 0.2866 0.3411 0.2728 0.5264 0.5113 0.4992 1.1912 0.7994 0.6376 0.7757 0.7074 0.7691 0.7540 0.7419 2.3692 0.6574 0.7046 0.6484 0.5193 0.6072 1.8518 0.5354 0.7261 0.2741 0.2058 0.6498 0.4867 1.3344 0.7249 0.7621 0.7787 0.7669 0.6487 0.4776 1.3344 0.5329 0.6301 0.7861 0.6467 0.6316 0.4726 1.344 0.5479 0.6064 0.5321 0.7816 0.5326 0.6395 1.3489 0.6850 0.6316 0.5321 0.5170 0.5395 1.3169 0.6854 0.6376 0.6326 0.6326 0.6326 0.6339 1.3169 0.5364 0.6376 0.6326 0.6326 0.6326 0.6326 1.344 0.5364 0.6376 0.6339 0.6339 0.6339 1.343	7	0.4305	0.4677	0.5354	0.5919	0.5236	0.6610	0.6459	0.6338	1.7086	1.6684	1.6252
0.7894 0.8366 0.7797 0.7074 0.7691 0.7540 0.7419 2.3290 2.3290 0.4864 0.5192 0.5249 0.6344 0.6193 0.6072 1.8518 1.8116 0.6574 0.7046 0.2464 0.2058 0.6996 0.4847 0.4726 1.3344 1.2942 0.7249 0.7621 0.7967 0.8552 0.7869 0.8013 0.7862 0.7741 2.4065 1.3344 0.7249 0.7621 0.7967 0.8563 0.6567 0.6516 0.4899 1.3464 0.7249 0.7621 0.7987 0.2853 0.7865 0.6916 0.6516 1.3468 1.3468 0.6504 0.6504 0.2853 0.6516 0.6839 0.6718 1.9263 1.8488 1.3166 0.5364 0.6604 0.9346 0.6653 0.6939 0.6718 1.9263 1.8489 1.3466 0.5364 0.4236 0.4845 0.7949 0.6949 0.6749 0.6749 1.9649	0.7394 0.6366 0.7192 0.7757 0.7074 0.7691 0.7540 0.7419 2.3692 0.6674 0.7046 0.4684 0.5249 0.4566 0.6344 0.6193 0.6072 1.8518 0.5354 0.7046 0.2741 0.2058 0.4847 0.4726 1.3344 0.7249 0.7249 0.2741 0.2058 0.4898 0.4847 0.4741 2.4658 0.7249 0.7621 0.7997 0.5351 0.5351 0.7852 0.7741 2.4665 0.5929 0.6876 0.6876 0.6316 0.5367 0.6316 0.5469 1.376 0.6804 0.6876 0.6863 0.6336 0.6349 0.6349 0.6349 1.376 0.5804 0.6876 0.7933 0.6839 0.6806 0.6349 0.6349 0.6349 0.6349 0.6349 0.6349 0.6443 0.5443 0.5443 0.6344 0.6349 0.6344 0.6346 0.6346 0.6346 0.6346 0.6346	6	0.2985	0.3357	0.2846	0.3411	0.2728	0.5264	0,5113	0.4992	1,1912	1,1510	1,1078
0.6574 0.7046 0.4684 0.5249 0.4566 0.6193 0.6072 1.8518 1.8116 0.5334 0.5726 0.2176 0.2741 0.2056 0.4996 0.4847 0.4726 1.3344 1.2942 0.7249 0.7249 0.7669 0.4847 0.4726 1.3344 1.2942 0.7249 0.7679 0.6044 0.5361 0.6567 0.6395 1.8699 1.8468 0.4609 0.4981 0.2971 0.2853 0.6356 0.6395 1.8689 1.8468 0.5504 0.6876 0.6863 0.6336 0.6399 0.6394 1.3716 1.3314 0.5504 0.6876 0.6863 0.6839 0.6743 2.4437 2.4638 0.5864 0.6876 0.6863 0.6839 0.6778 1.9263 1.8866 0.5864 0.5836 0.6839 0.6778 1.9263 1.3666 0.5864 0.5843 0.6724 0.5452 0.5737 1.4306 1.3647 1.36	0.6674 0.7046 0.4684 0.5249 0.6344 0.6193 0.6072 1.8518 0.5334 0.5726 0.2176 0.2741 0.2058 0.4996 0.4847 0.4726 1.3344 0.7249 0.7621 0.7967 0.6352 0.7869 0.6867 0.6316 0.6395 1.3344 0.7249 0.7621 0.7971 0.5351 0.7862 0.7741 2.4055 0.5929 0.6301 0.2971 0.3336 0.2837 0.6356 0.6316 0.6396 1.316 0.6504 0.6376 0.6639 0.6316 0.6316 0.6316 1.376 1.316 0.5184 0.6376 0.6453 0.6453 0.6539 0.6136 1.316 0.5184 0.4346 0.6463 0.6539 0.6136 1.3263 0.6439 0.6136 1.3263 0.6433 0.6453 1.433 0.5182 0.4456 0.6453 0.6453 0.6453 0.6453 0.6453 1.5263 0.5125 <td>12</td> <td></td> <td>0.8366</td> <td>0.7192</td> <td>0.7757</td> <td>0.7074</td> <td>0.7691</td> <td>0.7540</td> <td>0.7419</td> <td>2.3692</td> <td>2.3290</td> <td>2.2858</td>	12		0.8366	0.7192	0.7757	0.7074	0.7691	0.7540	0.7419	2.3692	2.3290	2.2858
0.5324 0.5726 0.2176 0.2741 0.2058 0.4998 0.4847 0.4726 1.3344 1.2942 0.7249 0.7621 0.7987 0.8552 0.7869 0.8013 0.7862 0.7741 2.4065 2.3663 0.5929 0.6301 0.5479 0.6044 0.5361 0.6667 0.6516 0.6395 1.8890 1.8488 0.4609 0.4981 0.2971 0.3536 0.2853 0.5321 0.5170 0.5049 1.3716 1.3314 0.6504 0.6574 0.6576 0.6576 0.6579 1.3716 1.3314 0.6574 0.6574 0.6574 0.6579 0.6079 0.5049 1.3716 1.3314 0.5556 0.6573 0.6838 0.6155 0.6839 0.6718 1.9263 1.8861 0.5184 0.5556 0.6273 0.6838 0.6155 0.6839 0.6718 1.9263 1.8861 0.5364 0.4236 0.3765 0.7893 0.6155 0.5942 0.5371 1.4088 1.3686 0.5457 0.9244 0.8111 0.8676 0.7993 0.8070 0.7919 0.7798 2.5869 2.5467 0.6232 0.7924 0.5109 0.7798 0.5452 0.7924 0.5109 0.7798 2.5869 2.5467 0.6232 0.6452 0.5105 1.5108 1.5520 1.5118 0.6232 0.6452 0.5109 0.6452 0.5105 1.5108 0.5452 0.5452 0.5105 1.5108 0.6452 0.5109 0.7798 0.6952 0.6452 0.5709 0.5959 0.6652 0.7924 0.5709 0.5959 0.6952 0.7924 0.5709 0.	0.5334 0.5726 0.2176 0.2741 0.2058 0.4996 0.4847 0.4726 1.3344 0.7249 0.7621 0.7967 0.8552 0.7869 0.8013 0.7862 0.7741 2.4065 0.5929 0.6301 0.5479 0.6044 0.5361 0.6516 0.6395 1.8890 0.6504 0.2971 0.336 0.2853 0.5170 0.5369 1.3716 0.6504 0.6574 0.6663 0.6316 0.5699 1.3716 2.4437 0.5184 0.5556 0.6273 0.6838 0.6155 0.6990 0.6839 0.6718 1.9263 0.5184 0.5556 0.6273 0.6838 0.6155 0.6990 0.6839 0.6718 1.9263 0.5867 0.7993 0.6970 0.7919 0.7799 0.5492 0.5371 1.4088 0.6232 0.7804 0.6873 0.6452 0.5109 0.5452 0.5109 1.5262 2.0693 0.6232 0.7604 0.660	8	0	0.7046	7937. 0	0.5249	0.4566	0.6344	0.6193	0.6072	1.8518	1.8116	1.7664
0.7249 0.7249 0.7249 0.7249 0.7249 0.7249 0.7249 0.7249 0.7249 0.6479 0.6044 0.5361 0.6566 0.6395 1.8899 1.8488 1.8489 1.8488 1.8881<	0.7249 0.7621 0.7987 0.8552 0.7669 0.8013 0.7862 0.7741 2.4065 0.5929 0.6301 0.5479 0.6044 0.5361 0.6567 0.6516 0.6395 1.8890 0.4609 0.4981 0.2971 0.3536 0.2853 0.5170 0.5049 1.3716 0.6504 0.6574 0.6836 0.6370 0.6396 1.3716 2.4437 0.5184 0.5556 0.6273 0.6836 0.6155 0.6990 0.6839 0.6718 1.9263 0.5184 0.5556 0.6273 0.6836 0.6155 0.6990 0.6839 0.6718 1.9263 0.3864 0.4236 0.3765 0.7993 0.6972 0.5371 1.4688 0.6232 0.9244 0.8111 0.8676 0.7993 0.6724 0.5105 1.5520 0.6232 0.6604 0.3095 0.3465 0.6724 0.6573 0.6452 0.7046 0.6573 0.6105 0.7046 0.68	2		0.5726	0.2176	0.2741	0.2058	0.4998	0.4847	0.4726	1,3344	1.2942	1.2510
0.5929 0.6301 0.5479 0.6044 0.5361 0.6567 0.6316 0.6395 1.8890 1.8488 1.8489<	0.5929 0.6391 0.5479 0.6044 0.5361 0.6567 0.6516 0.6395 1.8890 0.4609 0.4981 0.2971 0.3536 0.2853 0.5370 0.5049 1.3716 0.6504 0.6574 0.6876 0.6876 0.6876 0.6877 0.6876 0.6879 0.6718 1.9263 0.5184 0.5556 0.6273 0.6876 0.6155 0.6990 0.6839 0.6718 1.9263 0.5184 0.5356 0.6273 0.6876 0.7993 0.6990 0.6839 0.6718 1.9263 0.5867 0.7924 0.7993 0.6970 0.7919 0.7799 2.5692 0.6232 0.7924 0.8676 0.7993 0.6724 0.6573 0.6452 2.0695 0.6232 0.6604 0.3095 0.9485 0.6724 0.6573 0.6452 2.0695 0.6807 0.7779 0.6980 0.6724 0.6573 0.6452 2.0697 0.6807 0.7779 0.69	5		0.7621	0.7987	0.8552	0.7869	0.8013	0.7862	0.7741	2.4065	2.3663	2.3231
0.4609 0.4961 0.2971 0.3536 0.5221 0.5170 0.5049 1.3716 1.3314 0.6504 0.6876 0.6876 0.6863 0.6836 0.6839 0.6718 1.9263 1.8861 0.5184 0.5556 0.6773 0.6836 0.6136 0.6839 0.6718 1.9263 1.8861 0.3864 0.4236 0.3765 0.7993 0.6990 0.6839 0.6718 1.9263 1.8861 0.3864 0.4236 0.3765 0.7993 0.8070 0.7919 0.7798 2.5869 2.5467 0.6232 0.9244 0.8111 0.8676 0.7993 0.6072 0.5737 0.6452 2.0693 2.0693 2.0693 0.6232 0.6604 0.3095 0.3485 0.5726 0.5109 2.5264 2.5869 2.5840 0.6232 0.6604 0.3095 0.6777 0.7046 0.6895 0.6774 2.1067 2.0695 2.0695 0.6807 0.7757 0.7046 <th< td=""><td>0.4609 0.4981 0.2971 0.3336 0.2853 0.5321 0.5170 0.5069 1.3716 0.6504 0.6876 0.6781 0.9346 0.6663 0.6336 0.8885 0.6064 2.4437 0.5184 0.5556 0.6273 0.6836 0.6155 0.6990 0.6839 0.6718 1.9263 0.3864 0.4236 0.3765 0.4330 0.3647 0.5693 0.6718 1.9263 0.3864 0.4236 0.3765 0.7993 0.6932 0.5371 1.4068 0.5252 0.7924 0.8676 0.7993 0.8070 0.7919 0.7798 2.5869 0.6232 0.6604 0.3095 0.3660 0.2977 0.6573 0.6452 2.0695 0.6232 0.6604 0.3095 0.3660 0.2977 0.5377 0.5276 0.5105 1.5520 0.6807 0.7179 0.6962 0.6279 0.7046 0.6895 0.6174 2.1067 0.6807 0.7179 0.69</td><td>5</td><td></td><td>0,6301</td><td>0.5273</td><td>0.6044</td><td>0.5361</td><td>0.6567</td><td>0.6516</td><td>0.6395</td><td>1.8890</td><td>1.8488</td><td>1.8056</td></th<>	0.4609 0.4981 0.2971 0.3336 0.2853 0.5321 0.5170 0.5069 1.3716 0.6504 0.6876 0.6781 0.9346 0.6663 0.6336 0.8885 0.6064 2.4437 0.5184 0.5556 0.6273 0.6836 0.6155 0.6990 0.6839 0.6718 1.9263 0.3864 0.4236 0.3765 0.4330 0.3647 0.5693 0.6718 1.9263 0.3864 0.4236 0.3765 0.7993 0.6932 0.5371 1.4068 0.5252 0.7924 0.8676 0.7993 0.8070 0.7919 0.7798 2.5869 0.6232 0.6604 0.3095 0.3660 0.2977 0.6573 0.6452 2.0695 0.6232 0.6604 0.3095 0.3660 0.2977 0.5377 0.5276 0.5105 1.5520 0.6807 0.7179 0.6962 0.6279 0.7046 0.6895 0.6174 2.1067 0.6807 0.7179 0.69	5		0,6301	0.5273	0.6044	0.5361	0.6567	0.6516	0.6395	1.8890	1.8488	1.8056
0.6504 0.6876 0.8761 0.9346 0.8663 0.6836 0.8385 0.8064 2.4437 2.4035 0.5184 0.5556 0.6273 0.6836 0.6136 1.9263 1.8861 0.3864 0.4236 0.3765 6.4330 0.6156 0.5492 0.6371 1.4098 1.3686 0.8872 0.9244 0.8111 0.8676 0.7993 0.8070 0.7919 0.7798 2.5869 2.5467 0.7552 0.7924 0.5603 0.6168 0.2977 0.6724 0.6573 0.6452 2.0695 2.5467 0.6232 0.7604 0.5724 0.5724 0.5726 0.5105 1.518 0.6232 0.6604 0.3095 0.2977 0.0537 0.6242 0.5105 1.5520 1.518 0.6232 0.6604 0.6990 0.6970 0.6774 0.6174 2.1067 2.0665 0.6807 0.7179 0.6952 0.6279 0.7046 0.6895 0.5728 1.5491	0.6504 0.6876 0.8761 0.9346 0.8663 0.8356 0.8064 2.4437 0.5184 0.5556 0.6273 0.6836 0.6155 0.6990 0.6839 0.6718 1.9263 0.3864 0.4236 0.4236 0.3765 0.4330 0.6155 0.6990 0.6839 0.6718 1.9263 0.8872 0.9244 0.8111 0.8676 0.7993 0.8070 0.7919 0.5492 0.5371 1.4088 0.6232 0.7924 0.5608 0.5485 0.6724 0.6573 0.6452 2.0695 0.6232 0.6604 0.3095 0.3660 0.2977 0.5377 0.6573 0.6452 2.0695 0.6237 0.6905 0.9470 0.8787 0.5377 0.5376 0.5105 1.5520 0.6807 0.7179 0.6962 0.6279 0.7046 0.6895 0.6774 2.1067 0.5819 0.7559 0.7046 0.6895 0.6774 2.1067 0.6063 0.77	23	0	0.4981	0.2971	0.3536	0.2853	0.5321	0.5170	0.5049	1.3716	1.3314	1.2882
0.5184 0.5556 0.6273 0.6836 0.6155 0.6990 0.6839 0.6718 1.9263 1.9861 0.3864 0.4236 0.3765 6.4330 0.3647 0.5643 0.5492 0.5371 1.6068 1.3586 0.8872 0.9244 0.8111 0.8676 0.7993 0.8070 0.7919 0.7798 2.5869 2.5467 0.6232 0.7924 0.5603 0.6168 0.5485 0.6724 0.6573 0.6452 2.0695 2.0293 0.6232 0.6604 0.3095 0.3485 0.2977 0.5377 0.6572 0.5105 1.5118 0.6232 0.6604 0.3095 0.3467 0.2977 0.6397 0.6272 0.5105 1.5520 1.5118 0.6807 0.7179 0.6970 0.6779 0.7046 0.6895 0.6774 2.1067 2.0665 0.7187 0.7757 0.7046 0.6895 0.5428 1.5491 1.5401 0.6053 0.9700 1.02562 <t< td=""><td>0.5184 0.5556 0.6273 0.6836 0.6155 0.6990 0.6839 0.6718 1.9263 0.3864 0.4236 0.3765 6.4330 0.3647 0.5643 0.5492 0.5371 1.4066 0.8872 0.9244 0.8111 0.8676 0.7993 0.8070 0.7919 0.7798 2.5869 0.6232 0.7924 0.5103 0.6168 0.5485 0.6724 0.6573 0.6452 2.0659 0.6232 0.6004 0.3095 0.3660 0.2977 0.5377 0.6573 0.6452 2.0659 0.637 0.6499 0.3095 0.3467 0.6377 0.5377 0.6376 0.6576 0.5105 1.5520 0.6407 0.7179 0.6962 0.6279 0.7046 0.6895 0.6774 2.1067 0.5487 0.5489 0.4546 0.3771 0.5700 0.5549 0.5428 1.5893 0.7383 0.7755 0.7757 0.7369 0.7218 0.7097 2.1440</td><td>20</td><td>0</td><td>0.6876</td><td>0.8751</td><td>0.9346</td><td>0.8663</td><td>0.8336</td><td>0.8385</td><td>0.8064</td><td>2.4437</td><td>2.4035</td><td>2.3603</td></t<>	0.5184 0.5556 0.6273 0.6836 0.6155 0.6990 0.6839 0.6718 1.9263 0.3864 0.4236 0.3765 6.4330 0.3647 0.5643 0.5492 0.5371 1.4066 0.8872 0.9244 0.8111 0.8676 0.7993 0.8070 0.7919 0.7798 2.5869 0.6232 0.7924 0.5103 0.6168 0.5485 0.6724 0.6573 0.6452 2.0659 0.6232 0.6004 0.3095 0.3660 0.2977 0.5377 0.6573 0.6452 2.0659 0.637 0.6499 0.3095 0.3467 0.6377 0.5377 0.6376 0.6576 0.5105 1.5520 0.6407 0.7179 0.6962 0.6279 0.7046 0.6895 0.6774 2.1067 0.5487 0.5489 0.4546 0.3771 0.5700 0.5549 0.5428 1.5893 0.7383 0.7755 0.7757 0.7369 0.7218 0.7097 2.1440	20	0	0.6876	0.8751	0.9346	0.8663	0.8336	0.8385	0.8064	2.4437	2.4035	2.3603
0.3864 0.4236 0.3765 0.4636 0.3765 0.4636 0.3765 0.4636 0.3667 0.3663 0.5663 0.5667 0.5731 1.4088 1.3686 2.5467 0.6872 0.9244 0.8676 0.7993 0.8070 0.7919 0.7796 2.5869 2.5467 0.6232 0.9244 0.3095 0.3660 0.2977 0.6573 0.6452 2.0695 2.0293 0.6232 0.6604 0.3095 0.3660 0.2977 0.6377 0.6376 0.5105 1.5520 1.5118 0.6127 0.6279 0.6279 0.7046 0.6895 0.6774 2.1067 2.0665 0.5487 0.6279 0.7046 0.6895 0.5774 2.1067 2.0665 0.7383 0.7755 0.9562 0.6774 0.7566 0.6454 0.5770 0.5700 0.5426 0.5428 1.5491 0.7454 0.7757 0.7757 0.7757 0.7757 0.7757 0.7757 0.7757 0.7757	0.3864 0.4236 0.3765 0.3647 0.5643 0.5492 0.5371 1,6066 0.8872 0.9244 0.8111 0.8676 0.7993 0.8070 0.7919 0.7798 2.5669 0.6232 0.7924 0.5163 0.6168 0.5485 0.6724 0.6573 0.6452 2.0695 0.6232 0.6204 0.3095 0.3660 0.2977 0.5377 0.6576 0.5105 1.5520 0.6307 0.3099 0.9660 0.2977 0.6393 0.6262 0.5117 0.6397 0.6279 0.7046 0.6895 0.6174 2.1067 0.6407 0.6377 0.6279 0.7046 0.6895 0.6774 2.1067 0.5487 0.5487 0.3771 0.5700 0.5489 0.5428 1.5893 0.7383 0.7755 0.7757 0.7054 0.7369 0.7218 0.7097 2.1440 0.6053 0.5454 0.7757 0.7369 0.7218 0.7097 2.1440	8	0	0.5556	0.6273	0.6838	0.6155	0.6990	0.6839	0.6718	1.9263	1.8861	1.8429
0.8872 0.9244 0.8111 0.8676 0.7993 0.8070 0.7919 0.7798 2.5869 2.5467 0.6752 0.7924 0.5163 0.6168 0.5485 0.6724 0.6573 0.6452 2.0695 2.0293 0.6232 0.6604 0.3095 0.3660 0.2977 0.6337 0.6372 0.5105 1.5520 1.5118 0.6127 0.8470 0.6767 0.6393 0.6121 2.6242 2.5840 0.6807 0.7179 0.6397 0.6787 0.7046 0.6895 0.6774 2.1067 2.0665 0.5817 0.7179 0.6962 0.6279 0.7046 0.6895 0.6774 2.1067 2.0665 0.5487 0.3771 0.5700 0.5549 0.5428 1.5491 1.5491 0.7153 0.7757 0.9776 0.7757 0.7757 0.7757 0.7757 0.7757 0.7507 0.7507 0.7507 0.7507 0.7507 0.7507 0.7507 0.7507 0.7507	0.8872 0.9244 0.8111 0.8676 0.7993 0.8070 0.7919 0.7798 2.5869 0.6232 0.7924 0.5168 0.5485 0.6724 0.6573 0.6452 2.0695 0.6232 0.6604 0.3095 0.3660 0.2977 0.5377 0.5276 0.5105 1.5520 0.6127 0.6499 0.9470 0.6787 0.6393 0.6121 2.6242 0.6407 0.6397 0.6787 0.7046 0.6895 0.6774 2.1067 0.5487 0.5487 0.7046 0.6895 0.6774 2.1067 0.5487 0.5487 0.7046 0.6895 0.6774 2.1067 0.5487 0.5487 0.3771 0.5700 0.5549 0.5428 E.5893 0.7383 0.7755 0.7757 0.7369 0.7218 0.7097 2.1440 0.6053 0.5454 0.7354 0.6023 0.7218 0.7097 2.1440	2	0	0.4236	0.3765	6,4330	0,3647	0.5643	0.5492	0.5371	1,4068	1,3686	1,3254
6.7552 0.7924 0.5603 0.6168 0.2947 0.6573 0.6452 2.0695 2.0293 0.6232 0.6604 0.3095 0.2977 0.5377 0.5276 0.5105 1.5520 1.5118 0.6127 0.6499 0.6905 0.9470 0.6787 0.6393 0.6242 0.6121 2.6242 2.5840 0.6497 0.7179 0.6962 0.6779 0.7046 0.6895 0.6774 2.1067 2.0665 0.5487 0.5487 0.5489 0.5487 0.5489 0.5487 0.5489 0.5488 0.5428 0.	6.7552 0.7924 0.5603 0.6168 0.5485 0.6724 0.6573 0.6452 2.0695 0.6232 0.6604 0.3095 0.3660 0.2977 0.5337 0.5276 0.5105 1.5520 0.6317 0.6499 0.8905 0.9470 0.6787 0.6393 0.6242 0.8121 2.6242 0.6307 0.7179 0.6962 0.6279 0.7046 0.6895 0.6774 2.1067 0.5487 0.5859 0.7046 0.6895 0.6774 2.1067 0.5487 0.5700 0.5549 0.5728 1.5893 0.7383 0.7755 0.9771 0.5700 0.5549 0.5428 1.5893 0.7383 0.7755 0.7777 0.7074 0.7369 0.7218 0.7097 2.1440 0.6053 0.5443 0.55249 0.4566 0.6023 0.7218 0.7097 2.1440	12		0.9266	0.8111	0.8676	0.7993	0.8070	0.7919	0.7798	2.5869	2.5467	2.5035
0.6232 0.6604 0.3095 0.3660 0.2977 , 0.53?? 0.526 0.5105 1.5520 1.5118 0.6127 0.6499 0.6905 0.9470 0.6767 0.6393 0.6242 0.6121 2.6242 2.5840 0.6307 0.7179 0.6397 0.6962 0.6279 0.7046 0.6895 0.6774 2.1067 2.0665 0.5487 0.5487 0.5489 0.5454 0.3771 0.5700 0.5549 0.5428 [5.893 1.5491 0.7383 0.7755 0.9562 0.6773 0.5854 0.6443 2.6614 2.6212 0.6738 0.6438 0.6438 0.7757 0.7757 0.7269 0.7218 0.7218 0.7097 2.1440 2.1038 0.6731 0.6633 0.6438 0.6438 0.6438 0.6438 0.7757 0.7757 0.7759 0.7751 0.7751 1.6265 1.5863	0.6232 0.6604 0.3095 0.3660 0.2977 0.6397 0.6397 0.6397 0.6397 0.6397 0.6397 0.6397 0.6397 0.6397 0.6397 0.6397 0.6397 0.6397 0.6397 0.6397 0.6397 0.6397 0.6379 0.7046 0.6695 0.6774 2.1067 0.5487 0.3487 0.6454 0.3771 0.5700 0.5549 0.5428 E.5893 0.7383 0.7755 0.9771 0.5700 0.5549 0.5428 E.5893 0.6633 0.7755 0.7757 0.7074 0.7369 0.7218 0.7097 2.1440 0.6033 0.5435 0.5249 0.4566 0.65023 0.7218 0.7097 2.1440	3		0.7924	0.5603	0.6168	0.5485	0.6724	0.6573	0.6452	2.0695	2.0293	1,9861
0.8127 0.8499 0.8905 0.9470 0.8787 0.8393 0.8242 0.8121 2.6242 2.5840 0.6807 0.7179 0.6397 0.6952 0.6279 0.7046 0.6895 0.6774 2.1067 2.0665 0.5487 0.5487 0.5489 0.5454 0.3771 0.5700 0.5549 0.5428 E.5893 1.5491 0.7383 0.7755 0.9562 0.8713 0.8564 0.8443 2.6614 2.6212 0.6053 0.6053 0.6053 0.7757 0.7757 0.7759 0.7218 0.7218 0.7097 2.1440 2.1038 0.7757 0.7757 0.7757 0.7759 0.7218 0.7218 0.7218 1.6265 1.5863	0.8127 0.8499 0.8905 0.9470 0.8787 0.8393 0.8242 0.8121 2.6242 0.6807 0.7179 0.6397 0.6962 0.6279 0.7046 0.6895 0.6774 2.1067 0.5487 0.3829 0.4454 0.3771 0.5700 0.5549 0.5428 II.5893 0.7383 0.7755 0.9771 0.9582 0.6713 0.8544 2.6614 0.6053 0.7757 0.7074 0.7369 0.7718 0.7097 2.1440 0.6733 0.5115 0.5249 0.4566 0.6023 0.5872 0.5751 1.6265	3	0.6232	0.6604	0,3095	0.3660	0.2977	. 0.5377	\$225	0.5105	1.5520	1.5118	1.4686
0.6807 0.7179 0.6397 0.6962 0.6279 0.7046 0.6895 0.6774 2.1067 2.0665 0.5487 0.5487 0.5859 0.4454 0.3771 0.5700 0.5549 0.5428 E.5893 1.5491 0.7383 0.7755 0.9700 1.0265 0.9582 0.6715 0.6564 0.6843 2.6614 2.6212 0.6053 0.6438 0.7097 2.1440 2.1038 0.5425 0.6438 0.6643 0.6438 0.7097 2.1440 2.1038	0.6807 0.7179 0.6397 0.6962 0.6279 0.7046 0.6895 0.6774 2.1067 0.5487 0.5487 0.5489 0.5458 0.3489 0.5487 0.5893 0.7755 0.9700 1.0265 0.9582 0.6713 0.8564 0.8564 0.8643 2.6614 0.6053 0.6435 0.7757 0.7074 0.7369 0.7218 0.7097 2.1440 0.4743 0.5115 0.4684 0.5249 0.4566 0.6023 0.5872 0.5751 1.6265	5	0.8127	0.8499	0.8905	0.4%	0.8787	0.8393	0.8242	0.8121	2.6242	2.5840	2.5406
0.5487 0.5859 0.3889 0.4454 0.3771 0.5700 0.5549 0.5428 [.5893 0.7548 0.7755 0.9700 1.0265 0.9582 0.6715 0.6564 0.8443 2.6614 0.6053 0.6435 0.7757 0.7074 0.7369 0.7218 0.7097 2.1440	0.5487 0.5859 0.3889 0.4454 0.3771 0.5700 0.5549 0.5428 E.5893 0.7383 0.7755 0.9700 1.0265 0.9582 0.6715 0.6564 0.8443 2.6614 0.6053 0.6435 0.7757 0.7074 0.7369 0.7218 0.7097 2.1440 0.4743 0.5115 0.4684 0.5249 0.4566 0.6023 0.5872 0.5751 1.6265	2	0.6807	0.7179	0.6397	0.6962	0.6279	0.7046	0.6895	0.6774	2.1067	2.0665	2.0233
0.7383 0.7755 0.9700 1.0265 0.9582 0.8715 0.8564 0.8443 2.6614 0.6063 0.6435 0.7192 0.7757 0.7074 0.7369 0.7218 0.7097 2.1440	0.7383 0.7755 0.9700 1.0265 0.9582 0.8715 0.8564 0.8443 2.6614 0.6063 0.6435 0.7192 0.7757 0.7074 0.7369 0.7218 0.7097 2.1440 0.4743 0.5115 0.4684 0.5249 0.4566 0.6023 0.5872 0.5751 1.6265	8	0,5487	0.5859	0.3889	15770	0.3771	0.5700	0.5549	0.5428	£, 5893	1.5491	1.5059
0.6063 0.6435 0.7192 0.7757 0.7074 0.7369 0.7218 0.7097 2.1440	0.6063 0.6435 0.7192 0.7757 0.7074 0.7369 0.7218 0.7097 2.1440 0.4743 0.5115 0.4684 0.5249 0.4566 0.6023 0.5872 0.5751 1.6265	3	0.7383	0.7755	0.9700	1.0265	0.9582	0.8715	0.8564	0.8443	2.6614	2.6212	2.5780
1. 6.24.5 0 E118 0 4484 0 4948 0 4444 0 6073 0 5751 1.6265	0.4743 0.5115 0.4684 0.5249 0.4566 0.6023 0.5872 0.5751 1.6265	2	0.6063	0.6435	0.7192	0.7757	0.7074	0.7369	0.7218	0.7097	2.1440	2,1038	2.0606
	Cities Cities Commission Commissi		£ 7£ 7 V	2113	7877	0 5240	7757	0.6023	0.5872	0.5751	1.6265	1.5863	1.5431

TABLE XVII

Predictions of Gain Scores Based on Given Individual Group Pre Test Scores for Intervals

Pretest	Pred	Predicted Gain Score	Score	Predi	Predicted Gain Score	Score	0	100			- 1	
Score	į	for Variable	٧	for	for Variable		og .	uled reacted Celu		Tol	Fotal Predicted	ted
Group	<	e c		-	•		ŽĮ.	r variable	اد		Gain Score	
	, Y	15.	,		٩	3	V	2	ပ	V	æ	U
HHA	6 22	, č	7.6	3,52	3	2.94	3.22	3.47	5.07	13,19	11.58	10.48
H.		• • •	7.7	79.7	3.79	2.09	5.71	5.96	7.56	14.60	12.99	11 89
HVH	7	10.0	10.2	1.82	2.8	1.24	8.21	8.46	10.06	16.02	17 71	13.31
446		CI -7	ci.i	6.27	7.39	5.69	0.47	0.72	2.32	11.87	10 26	71.0
S	16.4	1.93	0.93	5.42	6.54	2.5	2.96	1.21	7 81	13.30	07.01	01.6
<u>.</u>	4.68	1.70	0.70	4.57	5,69	3.99	5.45	2 5	19.7	13.23	99.11	10.58
H :	3.82	9.8	-0.16	9.03	10,15	8,45	-2.29	5	9,70	14.71	13.10	12.00
¥	3.59	0.61	-0.39	8.18	9.30	7 60	2		•	10.30	8.95	7.85
五二	3.37	0.39	-0.61	7.33	8.45	75 7	٠. د	9 0	95.	11.97	10.36	9.56
AHI.	68.6	16.9	5.91	,	30		3	777	4.22	13.39	11.78	10,68
AHA	99.6	, f. A	2 68	60.1		2.23	2.84	3.09	4.69	15.56	13.95	12.85
AHL	77 6	97 9	2 46	1.30	5. IO	1.40	5.34	5.59	7.19	16.98	15.37	14.27
AAH	85	9		1.13	2.25	0.55	7.83	8.08 80.08	89.6	18.40	16.79	15.69
AAA	3.5	7.00	4.00	2.0	6.70	2.00	6	0,34	1.94	14.25	12.64	11.54
AAI	12	7.5	7.3	4.73	5.85	4.15	2.58	2.83	4.43	15.67	14.06	12.96
ALH	7 26	7.20	÷	99.0	8. 6. 6.	3.30	5.08	5,33	6.93	17.08	15.47	14.37
AIA	2 2	7.50	97.5	\$	9.46	7.76	-2.66	-2.41	-0.81	12.94	11,33	10.23
ALT.		8 6	8 6	64.7	6.61	6.91	-0.17	0.08	1.68	14,35	12.74	11.64
1.43	13 26	10.20	1000	200	7.76	6.06	2,32	2.57	4.17	15.77	14.16	13.06
LHA	13.03	10.20	97.6	2.16	3.28	1.58	2.48	2.73	4,33	17.89	16.28	15.18
E E	12.65		6.6	1.31	2.43	0.73	4.97	5.22	6.82	19,31	17.70	16.60
IAH	1 6	700	20.0	٠ ٠ ٠	1.57	-0.13	7.47	7.72	9.32	20,73	19,12	18.02
Y	11 73	7.	2.70	4.9	6.03	4.33	-0.28	-0.03	1.57	16.58	14.97	13.87
Į¥.	77 70		*:	8.6	5.18	3.48	2.22	2.47	4.07	17,99	16.38	15.28
17.1	10.63	10.0	10.7	3.21	4,33	2.63	4.71	7.96	6.56	19.41	17.80	16.70
114	10.60	7.43	6.63	96.7	8.78	7.08	-3.03	-2.78	-1.18	15.26	13,65	12.55
TIT	10 17	7 10	7.0	10.0	7.93	6.23	-0.54	-0.29	1.31	16.68	15.07	13.97
		(1.1)	61.0	3.46	.08	5.38	1.96	2.21	3.81	18,10	16.49	15,39

TABLE XVIII

Predictions of Percentage Gain Based on Given Individual Group Pretest Scores for Interval

Pretest	Pred	Predicted Gain Score	In Score	Predi	Predicted Gain Score	Score	Pre	Predicted Gein Score	in Score		Total Predicted	dicted
Score	£o	for Veriable	A .	toj	for Variable	9	£	for Variable) o		Gain Score	ore
Gro	Group A	8	၁	٧	æ	ပ	٧	Ø	ပ	A	6 0	ပ
田田	0.7419	0.5313	0.3039	0,3602	0.5443	0.3402	0.3253	0.3705	0.4031	1.4274	1.4461	1.0472
HH	0.6568	0.4462	0,2188	0.2162	0.4003	0.1962	0,3361	0.3813	0.4139	1,2091	1,2278	0.8289
呂	0.5718	0.3612	0.1338	0.0722	0.2563	0.0522	0.3468	0.3920	0.4246	0.9908	1.0095	0.6106
HVH	0.7093	0.4987	0.2713	0.4435	0.6276	0.4235	0,1932	0.2384	0.2710	1.3460	1.3647	0.9658
₩	0.6243	0.4137	0.1863	0.2995	0.4836	0.2795	0.2040	0.2492	0.2818	1.1277	1.1464	0.7475
HAL	0.5392	0.3286	0.1012	0.1554	0.3395	0.1354	0.2147	0.2599	0.2925	0.9094	0.9281	0.5292
HTH	0.6768	0.4662	0.2388	0.5267	0.7108	0.5067	0.0611	0.1063	0.1389	1.2646	1.2833	0.8844
¥	0.5917	0.3811	0.1537	0.3827	0.5668	0.3627	0.0719	0.1171	0.1497	1.0463	1.0650	0.6661
HL	0.5067	0.2961	0,0687	0.2387	0.4228	0.2187	0.0827	0.1279	0,1605	0,8280	0.8467	0,4478
AHH	0.7976	0.5370	0.3596	0.3595	0.5437	0.3396	0.2990	0.3442	0.3768	1.4562	1.4749	1.0760
AHA	0.7126	0.5320	0.2746	0.2156	0.3997	0.1956	0,3098	0.3550	0.3876	1,2379	1.2566	0.85//
AH	0.6275	0.4169	0.1895	0.0716	0.2557	0.0516	0.3205	0.3657	0.3983	1.0196	1.0383	0.6394
AAH	0.7651	0.5545	0.3271	0.4429	0.6270	0.4229	0,1669	0.2121	0.2447	1.3748	1.3935	9766.0
W	0.6800	0.4694	0.2420	0.2988	0.4829	0.2783	0.1777	0.2229	0.2555	1,1565	1.1752	0.7763
W	0.5950	0.3844	0.1570	0.1548	0.3389	0.1348	0.1885	0.2337	0.2663	0.9382	0.9569	0.5580
ALH	0.7325	0.5219	0.2945	0.5261	0.7102	0.5061	0.0348	0.0800	0.1126	1,2934	1.3121	0.9132
٨٢	0.6475	0.4369	0.2095	0.3821	0.5662	0.3621	0.0456	0.0908	0,1234	1.0751	1.0938	0.6949
ALL	0.5624	0,3518	0,1244	0,2381	0,4222	0,2181	0.0564	0,1016	0,1342	0,8568	0.8755	0,4766
田工	0.8521	0.6415	0.4141	0.3590	0.5431	0.3390	0.2733	0,3185	0.3511	1.4843	1.5030	1.1041
LHA	0.7670	0.5564	0.3290	0.2150	0.3991	0.1950	0.2841	0,3293	0.3619	1.2660	1.2847	0.8858
LH	0.6820	0.4714	0.2440	0.0709	0.2550	0.0509	0.2948	0.3400	0.3726	1.0478	1.0665	0.6676
I'YH	0.8195	0.6089	0.3815	0.4422	0.6263	0.4222	0,1412	0.1864	0.2190	1,4030	1.4217	1.0228
	0.7345	0.5239	0.2965	0.2982	0.4823	0.2782	0,1520	0.1972	0.2298	1.1847	1.20%	0.8045
Š	0.6494	0.4388	0.2114	0.1542	0,3383	0.1342	0.1627	0.2079	0.2405	0.9664	0.9851	0.5862
L'.H	0.7870	0.5764	0.3490	0.5255	0.7096	0.5055	0.0091	0.0543	0.0869	1.3216	1.3403	0.9414
11	0.7019	0,4913	0.2639	0.3815	0.5656	0.3615	0.0199	0.0651	0.0977	1.1033	1.1220	0.7231
TTT	0.6169	0,4063	0,1789	0.2375	0.4216	0.2175	0.0307	0.0759	0,1085	0.8850	0.9037	0.5048



TABLE XIX

Predictions of Gain Scores Based on Given Individual Group Pre Test Scores for Tone Groups

Destroy	Pred	Predicted Gain Score	Score	Pred1	Predicted Gain	Score	Pred	lcted Gain	Score	Total	al Predic	p d
10111	103	Verteble		for	Variable	82	for		ပ	١	Cain Scor	1
SCORE	101	91087 18A 101	ر	*	6 0	ပ	V	. 1	ပ		2	ပ
Cronb	10.53	0 53	7.36	4.74	8.41	4.13	6.53		8.27		22.55	19.76
	() a	20.7	5,33	0.68	4,35	0.07	13.48		15.22		23.42	20.63
Y 155	96.9	76.	3.77	-2.44	1.23	-3.05	18.84		20.58		24.09	21.30
	20.0	50.0	3.88	14.39	18.06	13,78	3.84		5.58		26.03	23.24
E 445		60.4	1.85	10, 33	14.00	9.72	10.79		12.53		26.90	24.11
7 T T	30.0	2 46	0.29	7.21	10.88	6.60	16.15		17.89		27.57	24.78
555	7 . 5	2.57	0,40	24.04	27,71	23,43	1.15	-0.77	2.89	28.76	29.51	26.72
G ₹	75.1	95.0	-1.63	19.99	23.66	19.38	8.09		9.83		30,38	27.59
S S		-1 02	-3.19	16.87	20.54	16.26	13,45		15.19	- 1	31.05	28.26
AH	13.81	12.81	10.62	-1,42	2.25	-2.03	0.28		2.02		13.41	10.62
AUA	11 78	10.78	8.61	-5.47	-1.80	-6. 08	7.23		8.97		14.28	11.49
4 15	10 22	0 22	7.05	-8.60	-4.93	-9.21	12.58		14.32		14.95	12.16
TAN A	10.33	0.33	7.16	8.23	11.90	7,62	-2.42		-0.68		16.89	14.10
	0.0	7.30	5.13	4.18	7.85	3.57	4.53		6.27		17.76	14.97
E T	2° 9	2. 74	3.57	1.05	4.72	97.0	68.6		11.63		18.43	15.64
N I H	8.8	5.85	3.68	17.89	21.56	17.28	-5.11		-3.37		20.37	17.58
¥14	6 8 7	3.82	1.65	13.84	17,51	13,23	1.84		3.58		21.24	18.45
5 1 7	30.5	2.26	0.0	10,71	14,38	10,10	7,19	- 1	8.93	- 1	21.91	19, 12
H	17.08	16.08	13.91	-7.58	-3.91	-8.19	-5.98		-4.24		4.28	1.49
¥9.1	15.06	14.06	11.89	-11.63	-7.96	-12.24	0.97		2.71		5.15	2.36
§ 5	13.60	12.49	10.32	-14.75	-11.08	-15.36	6.33		8.07		28.5	3.03
IAH	13.60	12.60	10.43	2.07	5.74	1.46	-8.67		-6.93		7.76	4.97
! !	11.58	10.58	17.8	-1.98	1.69	-2.59	-1.72		0.02		8.63	2.84
§ 3	20.01	6	6.85	-5.10	-1.43	-5.71	3.63		5.37		9.30	6.51
\$:	10.02	0 12	6.95	11.73	15.40	11.12	-11.37		-9.63		11.24	8.45
# T	8 10	7.10	4.93	7.68	11,35	7.07	-4.42		-2.68		12.11	9.32
13	6.53	5.53	3,36	4.55	8.22	3.94	0.94		2.68		12.78	6.6



TABLE XX

Predictions of Percentage Gain Based on Given Individual Group Pretest Scores for Tone Groups

for Variable A for Variable B for Variable B for Variable C A A Cor Variable C Cor Varia	Pretest	Pred	Predicted Gain Scor	n Score	Pred	Predicted Gain Score	Score	Pred	Predicted Gain	n Score	Te	Total Predicte	Cred
A B C A B C A B C A B C A B C A B C A B C A B C A B C C A B C A B C A B C A B C A B C A B C A B C A B C A B C A B C C A B C C A B C C C C D C D	Score	ဌ	r Veriebl	ı	fo	r Variable	8	fo	r Variabl		٠	_	
0,4625 0,4193 0,7864 0,1625 0,3100 0,1695 0,2339 0,1848 0,2808 0,8889 0,9051 0,3863 0,2343 0,2043 0,0052 0,1437 0,0122 0,3461 0,7450 0,7739	Group	V	8	ပ	·		•	<	æ	i		æ	
0.3863 0.3431 0.3002 0.0052 0.1437 0.0122 0.3941 0.3450 0.4416 0.7284 0.71863 0.5416 0.7186 0.6485 0.7525 0.7372 0.7372 0.3752 0.7384 0.7586 0.6487 0.64876 0.64876 0.64876 0.64876 0.64876 0.64876 0.1467 0.1462 0.1324 0.1462 0.1324 0.1462 0.1462 0.0969 0.07472 0.1096 0.1464 0.1079 0.0060 0.6589 0.2441 0.0565 0.0076 0.1074 1.0196 0.9487 0.1464 0.1029 0.0060 0.6519 0.2411 0.6589 0.2141 0.6589 0.1776 0.1576 0.1475 0.1076 <td< td=""><td>HHH</td><td>0.4625</td><td>0.4193</td><td>0.3764</td><td>0, 1625</td><td>İ</td><td>0.1695</td><td>0.2339</td><td>0.1848</td><td>1</td><td>0 8589</td><td>0 9051</td><td>0 8267</td></td<>	HHH	0.4625	0.4193	0.3764	0, 1625	İ	0.1695	0.2339	0.1848	1	0 8589	0 9051	0 8267
0.3275 0.2843 0.2414 -0.1161 0.0224 -0.1091 0.5176 0.4685 0.5463 0.7759 0.7759 0.7759 0.7845 0.2485 0.6469 0.1485 0.6241 0.4926 0.1462 0.0561 0.1921 0.9774 1.0196 0.2231 0.1284 0.4469 0.3134 0.0563 0.0263 0.3753 0.9790 0.0796 0.2273 0.1214 0.2071 0.5476 0.2167 0.0766 0.1773 0.9790 0.0678 0.1074 1.0879 1.1741 0.2273 0.1791 0.0180 0.5475 0.6588 0.2167 0.1074 1.0879 1.1741 0.4755 0.4717 0.0179 0.6690 0.5315 0.0581 0.0586 0.1074 0.1989 0.1773 0.1989 0.1773 0.1989 0.1773 0.1773 0.1773 0.1773 0.1773 0.1773 0.1773 0.1773 0.1773 0.1773 0.1773 0.1773 0.1773 0.1773 0.1773	HH	0.3863	0,3431	0.3002	0,0052		0.0122	0,3941			0 7856	0.8318	A: 25 0
0.3425 0.2993 0.2564 0.6856 0.6241 0.4926 0.1452 0.0961 0.1927 0.1924 1.0196 0.2075 0.12643 0.1214 0.20563 0.2563 0.3523 0.9000 0.9462 0.2075 0.1643 0.11862 0.8091 0.9476 0.8161 0.0556 0.0076 0.1077 0.1077	HHI.	0.3275	0.2843	0.2414	-0.1161		-0,1091	0.5176			0 2200	7752	07070
0.2663 0.2231 0.1802 0.3284 0.4669 0.3354 0.3054 0.2563 0.3523 0.39000 0.4468 0.2075 0.1643 0.1214 0.2241 0.4289 0.3798 0.4786 0.8161 0.0565 0.0074 0.1074 1.0879 0.1141 0.4289 0.3798 0.4789 0.1167 0.2681 0.0076 0.1079 0.1167 0.1676 0.1074 1.0879 0.1167 0.1676 1.0104 0.0689 0.1167 0.1074 1.0608 0.0618 0.0658 0.0074 0.1676 0.1076 0.1076 0.1076 0.1076 0.1076 0.1076 0.1076 0.1076 0.0077 0.0689 0.0787 0.0077 0.0689 0.0787 0.0074 0.1076 0.0077 0.0689 0.0077 0.0077 0.0689 0.0077 0.0077 0.0689 0.0077 0.0077 0.0689 0.0077 0.0077 0.0444 0.0077 0.0077 0.0077 0.0077 0.0077 0.0077 0.0077 0.0077	HYH	0.3425	0.2993	0.2564	0.4856		0.4926	0, 1452			927.0	1 0196	0.0990
0.2075 0.1643 0.1214 0.2071 0.3456 0.2141 0.4289 0.4798 0.4758 0.4843 0.4843 0.4843 0.4843 0.4843 0.1844 0.1844 0.0869 0.0544 0.0863 0.0344 0.0869 0.0344 0.0869 0.0344 0.0864 0.1844 0.0864 0.1844 0.1844 0.0164 0.1844 0.1844 0.0449 0.0864 0.1844 0.1844 0.1844 0.1844 0.0449 0.0864 0.1844 0.1844 0.0444 0.0444<	HAA	0.2663	0.2231	0.1802	0.3284		0.3354	0.3054			0.000	0.0190	71 %6 °0
0.2223 0.1791 0.1362 0.8091 0.9476 0.8161 0.0565 0.00074 0.1034 1.0879 1.1341 0.04873 0.06879 0.6518 0.7903 0.6588 0.2167 0.1676 0.2636 1.0068 1.0068 0.4755 0.44372 0.6600 0.6518 0.0784 0.0891 0.1870 0.1871 0.2987 1.0166 0.2636 1.0068 0.4755 0.4372 0.4372 0.0874 0.0581 0.0891 0.0897 0.1871 0.1871 0.4445 0.3992 0.3560 0.3131 -0.2192 -0.0807 -0.2122 0.2187 0.1891 0.4445 0.1891 0.3405 0.01891 0.4244 0.1891 0.3418 0.3488 0.5587 0.3881 0.5587 0.3881 0.5587 0.5587 0.5587 0.5587 0.5187 0.1189 0.5687 0.0189 0.0898 0.1769 0.0184 0.5687 0.1502 0.1184 0.1848 0.1848 0.1848	HAI.	0.2075	0.1643	0.1214	0,2071		0.2141	0.4289			0.9636	0.8807	0/00.
0.1461 0.1029 0.0600 0.6518 0.7903 0.6588 0.2167 0.1676 0.2636 1.0462 0.0873 0.0475 0.4732 0.2011 0.3871 0.9580 1.0669 0.4755 0.4323 0.3069 0.0756 -0.0549 0.0581 0.0090 0.1050 0.4717 0.5179 0.4975 0.3430 0.3184 -0.2092 0.2927 0.4717 0.5179 0.4445 0.3940 0.2972 0.2543 -0.2192 -0.0807 -0.2122 0.2927 0.2927 0.3418 0.4445 0.3554 0.3122 0.2693 0.2022 0.2927 0.3887 0.3418 0.5879 0.3554 0.3122 0.2693 0.2642 0.1109 0.1297 0.0796 0.71645 0.5817 0.2704 0.1931 0.1019 0.1297 0.0866 0.1766 0.5178 0.5178 0.1850 0.1941 0.2644 0.1019 0.1297 0.0866 0.1766 0.1167	HLH	0.2223	0.1791	0.1362	0.8091		0.8161	0.0565			1.0879	1 351	1 0557
0.0873 0.0441 0.00012 0.5305 0.6690 0.5375 0.3402 0.2911 0.3871 0.9580 1.0042 0.4755 0.4323 0.3864 -0.0619 0.0766 -0.0549 0.0581 0.0090 0.1050 0.4717 0.5179 0.3404 0.0360 -0.0619 0.0766 -0.02122 0.2183 0.1692 0.2652 0.3981 0.4445 0.3404 0.2972 0.2787 0.2787 0.2788 0.0794 0.1887 0.3887 0.3488 0.3488 0.2792 0.2792 0.2612 0.1099 0.2682 -0.0305 0.0164 0.5861 0.6446 0.5178 0.5862 0.0109 0.1164 0.5862 0.5862 0.0164 0.1662 0.5862 0.0166 0.0164 0.5862 0.5917 0.0164 0.5862 0.5917 0.0164 0.5862 0.5917 0.0164 0.5862 0.5917 0.0164 0.5862 0.5917 0.0189 0.0164 0.5862 0.5914 0.5082	HLA	0.1461	0.1029	0.0600	0.6518		0.6588	0.2167			1.0146	1.0608	0.9824
0.4755 0.44123 0.3894 -0.0619 0.0766 -0.0549 0.0581 0.0090 0.11050 0.4717 0.4459 0.3992 0.3560 0.3131 -0.2192 -0.0807 -0.2122 0.2183 0.1692 0.2652 0.3418 0.4445 0.3404 0.2297 0.2543 -0.2020 -0.3335 0.0164 0.2652 0.3418 0.3448 0.3554 0.2360 0.1931 0.1039 0.2424 0.1109 0.1266 0.1766 0.5128 0.5567 0.2204 0.1772 0.1343 -0.0173 0.1212 -0.0199 0.1766 0.1766 0.5128 0.5567 0.2504 0.1772 0.1343 -0.0173 0.1212 -0.1092 0.0649 0.0164 0.5847 0.7212 0.5014 0.5847 0.7212 0.5164 0.0609 0.0164 0.5273 0.5024 0.1590 0.1158 0.0729 0.4244 0.5444 0.5446 0.7174 0.0609 0.0679 0.0679	=	0.0873	0.0441	0,0012	0.5305		0,5375	0.3402			0.9580	1 0062	0 0258
0.3992 0.3560 0.3131 -0.2192 -0.0807 -0.2122 0.2183 0.1692 0.2652 0.3887 0.3448 0.1448 0.1887 0.3418 0.1897 0.3887 0.3418 0.1887 0.3418 0.1887 0.3418 0.1887 0.3418 0.1887 0.3418 0.1887 0.3418 0.1887 0.3129 0.0887 0.0189 0.01	AIDE	0,4755	0.4323	0.3894	-0.0619		-0.0549	0.0581		c	0.4717	0.5179	205.40
0.3404 0.2972 0.2543 -0.3405 -0.2020 -0.3335 0.3418 0.2927 0.3887 0.3418 0.3861 0.5861 0.5861 0.5323 0.3554 0.3122 0.2693 0.2612 0.3997 0.2682 -0.0395 -0.0796 0.0164 0.5861 0.6323 0.2702 0.2360 0.1931 0.1073 0.1212 -0.0109 0.1297 0.0806 0.1766 0.5128 0.5590 0.2204 0.1772 0.1343 -0.0173 0.1212 -0.0103 0.2532 0.2041 0.3001 0.4562 0.5704 0.1570 0.1471 0.122 0.531 0.6409 0.0602 0.0878 0.6273 0.573 0.1580 0.1471 0.2863 0.4344 0.6409 -0.1687 -0.0707 0.6273 0.6170 0.4884 0.4452 0.4023 -0.1478 -0.273 -0.1667 -0.0707 0.0844 0.1707 0.0844 0.1107 0.4121 0.3689 0.3260 </td <td>AHA</td> <td>0.3992</td> <td>0.3560</td> <td>0,3131</td> <td>-0.2192</td> <td></td> <td>-0.2122</td> <td>0.2183</td> <td></td> <td></td> <td>0, 3983</td> <td>0 4445</td> <td>0 3661</td>	AHA	0.3992	0.3560	0,3131	-0.2192		-0.2122	0.2183			0, 3983	0 4445	0 3661
0.3554 0.3122 0.2693 0.2612 0.3997 0.2682 -0.0305 -0.0796 0.0164 0.5861 0.6323 0.2792 0.2360 0.1931 0.1039 0.2424 0.1109 0.1297 0.0806 0.1766 0.5128 0.5590 0.2204 0.1772 0.1343 -0.0173 0.1212 -0.0103 0.2532 0.2041 0.3001 0.4562 0.5704 0.2352 0.1772 0.1781 0.5559 0.4344 0.0649 -0.082 0.0878 0.6273 0.6274 0.6264 0.1478 0.0245 0.1647 0.0645 0.1164 0.0064 0.0064 0.0077 0.0077 0.0064	AHL.	0.3404	0.2972	0.2543	-0.3405		-0.3335	0.3418			0.3418	0.3880	0.3046
0.2792 0.2360 0.1931 0.1039 0.2424 0.1109 0.1297 0.0806 0.1766 0.5128 0.5590 0.2204 0.1772 0.1343 -0.0173 0.1212 -0.0103 0.2532 0.2041 0.3001 0.4562 0.5024 0.2352 0.1920 0.1491 0.5847 0.7232 0.5917 -0.1192 -0.0723 0.7007 0.7007 0.7067 0.1590 0.0159 0.01691 0.5659 0.4344 0.0409 -0.0878 0.6273 0.6776 0.1002 0.0570 0.0141 0.3061 0.4446 0.3131 0.1645 0.1154 0.2114 0.5708 0.6776 0.4884 0.4452 0.4023 -0.1446 0.3131 0.1647 -0.0044 0.1106 0.4121 0.3889 0.32649 -0.4366 -0.1466 0.1169 0.0169 -0.0046 0.0042 -0.0046 0.0042 -0.0056 0.0044 0.0042 -0.0066 0.0044 0.0042 -0.2064 <	AAH	0.3554	0.3122	0.2693	0.2612		0.2682	-0.0305			0.5861	0.6323	0.5539
0.2204 0.1772 0.1343 -0.0173 0.1212 -0.0103 0.2532 0.2041 0.3001 0.4562 0.5024 0.2352 0.1920 0.1491 0.5847 0.7332 0.5917 -0.1192 -0.1683 -0.0723 0.7007 0.7469 0.1590 0.1158 0.0729 0.4446 0.3131 0.1645 0.2114 0.6273 0.6776 0.1002 0.0570 0.0141 0.2061 0.4446 0.3131 0.1647 0.0077 0.6776 0.6773 0.6773 0.4884 0.4452 0.02863 -0.1478 -0.2793 -0.11667 -0.0707 0.0844 0.1306 0.4121 0.3889 0.32649 -0.4366 -0.3466 0.1169 0.2129 -0.0455 0.0011 0.0167 0.354 0.3162 0.02649 -0.0436 -0.2554 -0.1594 0.1045 0.0045 0.0164 0.0164 0.0164 0.0164 0.0164 0.0164 0.0164 0.0164 0.0164 0.0164	¥	0.2792	0.2360	0.1931	0.1039		0.1109	0,1297			0.5128	0.5590	0.1806
0.2352 0.1920 0.1491 0.5847 0.7232 0.5917 -0.1192 -0.1683 -0.0723 0.7007 0.7469 0.1590 0.0159 0.0729 0.4274 0.5659 0.4344 0.0409 -0.0082 0.0878 0.6273 0.6775 0.1050 0.0151 0.3061 0.4446 0.3131 0.1645 0.1154 0.2114 0.5708 0.6170 0.4884 0.452 0.0423 -0.2863 -0.1478 -0.2793 -0.1176 -0.1667 -0.0707 0.0844 0.1106 0.4121 0.3689 0.3260 -0.4436 -0.3651 -0.4366 0.0425 -0.0066 0.0894 0.0111 0.0577 0.3534 0.3102 0.2673 -0.4264 -0.5579 0.1660 0.1169 0.2129 -0.0455 0.0011 0.0455 0.0066 0.0119 0.0119 0.0254 0.0159 0.0458 0.0159 0.0438 0.0254 0.0649 0.0254 0.0659 0.0066 0.0159 0.0159	W	0.2204	0.1772	0.1343	-0.0173		-0.0103	0.2532			0.4562	0.5024	0.4.40
0.1590 0.1158 0.0729 0.4274 0.5659 0.4344 0.0409 -0.0082 0.0878 0.6273 0.6775 0.1002 0.0570 0.0161 0.446 0.3131 0.1645 0.1154 0.2114 0.5708 0.6170 0.4884 0.4452 0.4023 -0.2863 -0.1478 -0.2793 -0.1176 -0.1667 -0.0707 0.0844 0.1106 0.4121 0.3689 0.3260 -0.4436 -0.3651 -0.4366 0.0425 -0.0066 0.0894 0.0111 0.0577 -0.0557 0.3534 0.3102 0.2673 -0.5649 -0.4264 -0.5579 0.1669 0.2129 -0.0455 0.0111 0.0577 0.3683 0.3267 -0.4366 0.0438 -0.2564 -0.2564 -0.5579 0.0461 -0.2594 -0.1565 0.0189 0.0159 0.0455 0.0189 0.1717 0.2221 0.2489 0.0264 -0.1354 0.0451 -0.0461 -0.0554 -0.1564 0.1134	ALH	0.2352	0.1920	0.1491	0.5847		0.5917	-0.1192			0.7007	0.7469	0.6685
0.1002 0.0570 0.0141 0.3061 0.4446 0.3131 0.1645 0.1154 0.2114 0.5708 0.6170 0.4884 0.4452 0.4023 -0.1478 -0.2793 -0.1176 -0.1667 -0.0707 0.0844 0.1306 0.4121 0.3689 0.3260 -0.4436 -0.4366 0.0425 -0.066 0.0894 0.0111 0.0573 0.3102 0.2673 -0.4649 -0.4364 -0.4364 -0.4564 -0.5579 0.1660 0.1169 0.2129 -0.0455 0.0007 0.3683 0.3261 -0.3649 -0.4264 -0.5579 0.1660 0.1159 0.1988 0.2450 0.2921 0.2489 0.2822 0.0180 -0.1135 -0.2641 -0.0554 -0.1594 0.1155 0.1171 0.2482 0.2689 0.0180 -0.1135 -0.2641 -0.0552 0.0008 0.1255 0.1171 0.2482 0.2591 0.1621 0.0269 0.0283 0.1243 0.1243	YI'	0.1590	0.1158	0.0729	0.4274		0.4344	0.0409			0.6273	0.6735	0.5951
0.4884 0.4452 0.4023 -0.1878 -0.1778 -0.1176 -0.1667 -0.0707 0.0844 0.1306 0.4121 0.3889 0.3260 -0.4436 -0.4366 0.0425 -0.0066 0.0894 0.0111 0.0573 0.3534 0.3102 0.2673 -0.4264 -0.4364 -0.4564 -0.4564 -0.4564 -0.4564 -0.4564 -0.5579 0.1660 0.1169 0.2129 -0.0455 0.0007 0.3683 0.3251 0.2682 0.0368 0.1753 0.0438 -0.2063 -0.1594 0.1988 0.2450 0.2921 0.2489 0.2060 -0.1135 -0.0461 -0.0952 0.0008 0.1717 0.2333 0.1907 0.1621 0.0133 -0.2348 0.0774 0.0283 0.1243 0.1855 0.2482 0.2050 0.1621 0.3672 -0.2950 -0.3441 -0.2481 0.3134 0.2482 0.2059 0.3672 0.3672 0.3441 0.0249 0.3441	ALL	0,1002	0.0570	0,0141	0,3061		0,3131	0,1645			0.5708	0.6170	0.5386
0.4121 0.3689 0.3260 -0.4436 -0.3051 -0.4366 0.0425 -0.0066 0.0894 0.0111 0.0573 0.3534 0.3102 0.2673 -0.5649 -0.4264 -0.5579 0.1660 0.1169 0.2129 -0.0455 0.0007 0.3683 0.3251 0.2822 0.0368 0.1753 0.0438 -0.2063 -0.2554 -0.1594 0.1988 0.2450 0.2921 0.2489 0.2060 -0.1103 -0.1135 -0.0461 -0.0552 0.0008 0.1717 0.2333 0.1907 0.1472 -0.2418 -0.1033 -0.2348 0.0774 0.0283 0.1243 0.0690 0.1152 0.2482 0.2050 0.1621 0.3602 0.4987 0.3672 -0.2950 -0.3441 -0.2481 0.1134 0.1875 0.2400 0.2862 0.1719 0.0858 0.2029 0.3414 0.2099 -0.1839 -0.0879 0.0879 0.01839 0.0879 0.1875 0.0879	HH.	0.4884	0.4452	0.4023	-0.2863		-0.2793	-0.1176			0.0844	0.1306	0.0522
0.3534 0.3102 0.2643 -0.4264 -0.5579 0.1660 0.1169 0.2129 -0.0455 0.0007 1 0.3683 0.3251 0.2822 0.0368 0.1753 0.0438 -0.2063 -0.2554 -0.1594 0.1988 0.2450 0.2921 0.2489 0.2060 -0.1205 0.0180 -0.1135 -0.0461 -0.0952 0.0008 0.1717 0.2333 0.1907 0.1472 -0.2418 -0.1033 -0.2348 0.0774 0.0283 0.1243 0.0690 0.1152 0.2482 0.2050 0.1621 0.3602 0.4987 0.3672 -0.2950 -0.3441 -0.2481 0.1134 0.3596 0.1719 0.1287 0.0858 0.2029 0.3414 0.2099 -0.1839 -0.0879 0.1875 0.1875 0.1875 0.1875 0.2207	≨ :	0.4121	0.3689	0,3260	-0.4436		-0.4366	0.0425			0,0111	0.0573	-0, (211
0.3683 0.3251 0.2822 0.0368 0.1753 0.0438 -0.2063 -0.2554 -0.1594 0.1968 0.2450 0.2921 0.2489 0.2060 -0.1205 0.0180 -0.1135 -0.0461 -0.0952 0.0008 0.1717 0.2333 0.1907 0.1472 -0.2418 -0.1033 -0.2348 0.0774 0.0283 0.1243 0.0690 0.1152 0.2482 0.2050 0.1621 0.3602 0.4987 0.3672 -0.2950 -0.3441 -0.2481 0.3134 0.3596 0.1719 0.1287 0.0858 0.2029 0.3414 0.2099 -0.1839 -0.0879 0.2020 0.0887 -0.0113 -0.0604 0.0356 0.1835 0.2297	LHL	0.3534	0.3102	0.2673	-0.5649		-0.5579	0.1660			-0.0455	0,0007	57 LO 0-
0.2921 0.2489 0.2060 -0.1205 0.0180 -0.1135 -0.0461 -0.0952 0.0008 0.1255 0.1717 0.2333 0.1907 0.1472 -0.2418 -0.1033 -0.2348 0.0774 0.0283 0.1243 0.0690 0.1152 0.2482 0.2050 0.1621 0.3602 0.4987 0.3672 -0.2950 -0.3441 -0.2481 0.3134 0.3596 0.1719 0.1287 0.0858 0.2029 0.3414 0.2099 -0.1348 -0.1839 -0.0879 0.2400 0.2862 0.1131 0.0699 0.0270 0.0817 0.2202 0.0887 -0.0113 -0.0604 0.0156 0.1835 0.2297	¥	0.3683	0.3251	0.2822	0.0368		0.0438	-0.2063			0, 1988	0.2450	0.1666
0.2333 0.190° 0.1472 -0.2418 -0.1033 -0.2348 0.0774 0.0283 0.1243 0.0690 0.1152 0.2482 0.2250 0.2050 0.1621 0.3602 0.4987 0.3672 -0.2950 -0.3441 -0.2481 0.3134 0.3596 0.1719 0.1287 0.0858 0.2029 0.3414 0.2099 -0.1348 -0.1839 -0.0879 0.2400 0.2862 0.1131 0.0699 0.0270 0.0817 0.2202 0.0887 -0.0113 -0.0604 0.0156 0.1835 0.2297	_	0.2921	0.2489	0.2060	-0.1205		-0,1135	-0.0461			0,1255	0.1717	0.6433
0.2482 0.2050 0.1621 0.3602 0.4987 0.3672 -0.2950 -0.3441 -0.2481 0.3134 0.3596 0.1719 0.1287 0.0858 0.2029 0.3414 0.2099 -0.1348 -0.1839 -0.0879 0.2400 0.2862 0.1131 0.0699 0.0270 0.0817 0.2202 0.0887 -0.0113 -0.0604 0.0356 0.1835 0.2297		0.2333	0,190	0.1472	-0.2418	•	-0.2348	0.0774			0.0690	0.1152	0.0368
0.1719 0.1287 0.0858 0.2029 0.3414 0.2099 -0.1348 -0.1839 -0.0879 0.2400 0.2862 0.1131 0.0699 0.0270 0.0817 0.2202 0.0887 -0.0113 -0.0604 0.0156 0.1835 0.2297	LLH	0.2482	0.2050	0.1621	0,3602		0.3672	-0.2950			0.3134	0.3596	0.2812
0.1131 0.0699 0.0270 0.0817 0.2202 0.0887 -0.0113 -0.0604 0.0156 0.1815 0.2247	[] Y	0.1719	0.1287	0.0858	0.2029		0.2099	-0.1348			0.2400	0.2862	0.2078
	11.1	0.1131	0.0699	0.0270	0.0817		0.0887	-0.0113	-0.0604	0.0356	0,1835	0.2297	0.1513



an effort to reduce the variability, the percentage gain score was introduced and in Parts II and III both the gain and percentage gain scores have been investigated. This section describes another attempt at forcing more homogeneity in the subjects.

Some of the subjects score quite high on the pretests. This fact insures that their gains are necessarily low and the use of percentage gain helps somewhat but does not seem to take care of these cases too well. In a rather arbitrary manner subjects were deleted if any one of their initial scores was more than one standard deviation above the mean. The resulting group is called the selected group. In the Autumn, the reduction was from 131 to 108, in Winter from 112 to 85, and in Spring from 101 to 80.

The means and standard deviation for the selected group are in Tables XXI-XXV. Tables XXVI, XXVII-XVIII contain the Variance-Covariance matrices that are pertinent to the analysis described in Part II. Tables XXX-XXXII contain the regression coefficient similar to Tables XII-XIV.

This analysis did not reveal any differences that were not evident without the group selection, although the gain scores were increased by selection, the variance or standard deviation was not changed appreciably. The percentage gain scores were reduced but so was the variance, so, again, not much was gained by selection. The analysis in Part II and summarized in Table XI shows very little difference between the total group and the selected group. A similar statement applies to the significant regression coefficients in Tables XI-XIV and XXX-XXXII.



Table XXI

Means, Stardard Deviations and Correlations for the Initial Scores, the Gain Scores and Percentage Gain Scores for Autuan Duple Rhythe Only

			Means			5.5	Standard Deviations	Deviation	Ü			Correlations	At fons	
Group	£	92 V	8 38	ن ع و	Tot 8 1 1 08	<	æ	C	Tota'	Ver. Peir	4	æ.	ر	of a
Initial														
Test	<	9.206	9.316	10,000	605.6	6.275	86.9	6.547	6.575	A-8	78.	. R5	ŧ.	8
	£	11.412	14.342		14.083	10,790	11, 148	10.678	10.860	V-V	RO	. 78	80	2
	C	17.971	18.026		18.500	11,438	13.070	13.849	11,342	B-C	96.	\$6.	65	75
Gain	<	19,882	15.158	18.444	17.761	11.428	12,913	13.752	12,805	A-B	98.	19	28	7,
	æ	14.059	35.684	34.750	34.861	12,331	11.426	13.580	17.362	A-C	19.	19	9	74
	·	75.70¢	11.132	12.178	32.204	11.541	12.825	14.965	14.965	B -C	.80	8.	. 84	8
Gein														
-bre	<	. 741	.650	.117	. 701	.221	236	.246	.236	A-B	36.	80	~	98
	æ	704	. 733	. 708	917.	. 254	. 195	.253	.233	A-C	26.	74	, a	78
	·	749	.687	.738	۲27.	722.	.216	. 282	.243	3− ℃	10	86	, c	ď

Table XXII

Means, Standard Deviations and Correlations for the Initial Scores, the Gain Scores and Percentage Gain Scores for Autumn Triple Rhythm Only

			Means	ıns		Š	tandard	Standard Deviations	Пs			Correlations	96094	
Group	c	7 7 Y	38	ن عو	Total 108	V	æ	ပ	Tot 1	Var. Patr	14	6	ر	Total
Intela	_													
Test		8.441	8.447		8.324	4.956	5.341	6.547	5.289	A- B	80	Š	Š	č
	æ	12.088	10,658	11.028	11.231	6.658	6.739	10.678	7.029	A-C	. 71	£	8.	78
	ပ	15.000	12.684		14.250	8.367	8.540	13.849	8,817	B-C	.89	8.	6.	06
Gein	<	17,176	14.842		111 71	6 260	5 703	0	0	:	;	}	;	1
	e c	13,324	15.658	14,333	14.481	5 978	72.1.9	7 282	6.517	A - K	, o.	? 5	æ ;	8 6. 3
	ပ	13,088	15.026		13.676	6.837	8.079	9.208	8,108	, C	79		٠ <u>٠</u>	٠. «۲
Gein										; :		<u> </u>	ì.	
36-pre	<	.645	.553	. 599	. 598	.248	.215	. 286	.251	A-8	.81	.17	.87	.80
	ထပ	.590	.640	.605	.612 .640	. 261 . 264	.230	.273	.253	۸-c ۳-c	77.	.62	. 2.	70.
										; 1		•	•	:



Table XXIII

Means, Standard Deviations and Correlations for the Initial Scores, the Gain Scores and Percentage Gain Scores for Atumn Duple and Triple Rhythm Combined

			Means				Standard	Standard Devistions	ons			Corre	Correlations	
Group	£	9¢	В 38	36 3	Tote1 108	A	æ	ပ	Total	Var. Pair	<	£	ပ	Total
Initial Test		17.647	17.763	18,083	17.833	9.822	10.551	9.250	9.812	A-B	16.	6.	98.	68.
	ကျေပ	25.500 32.971	25.000 30 <u>.</u> 711	25.472 34.694	25.315 32.750	15.985 20.135	16.985 19.687	15.055	15.651 19.700	A-C B-C	.91 96.	95	.93	.94
Gein	∢ ₽ ∪	57.059 47.382 45.882	50.000 51.342 46.158	54.889 49.083 45.583	53.852 49.343 45.880	16.456 16.569 15.863	16.114 15.260 17.605	19.473 17.560 19.840	17.500 16.393 17.708	A-B A-C B-C	.86 .64 .79	.68 .62	.85 .67 .83	.77 .63 .83
<u>Cain</u> 100-pre	< m ∪	. 709 . 670 . 726	.619 .702 .675	.678 .678 .715	.667 .684 .705	.223 .250 .227	.210	.241 . .241 .	.225 .226 .232	A- C B-C B-C	.94 .93	.82	.92	. 85 . 89

Table XXIV

Means, Standard Deviations and Correlations for the Initial Scores, the Gain Scores and Percentage Gain Scores for Winter Intervals

			Means			Š	tandard	Standard Deviation				60000	2003 101 0220	
Group	c	A 33	B 28	c 24	Total 85	٧	8 3	ပ	Total	Var. Pair	<	æ	Ü	Total
Inftial														
Test	-	8,394	7,500	7.667	7.894	3,791	4.476	3.852	4.018	A-B	0/.	.75	11.	7.3
	m (6.758	6.429	6.792	6.659	3,985	3,646	4.273	3.917	A- C	33	.57	.,,	. 35
	ပ	4.152	3.179	4.417	3,906	2.751	2,510	3.243	2.839	B-C	79.	69.	. 78	. 20
Gain.	<	9.394	5.964	5,500	7,165	3.230	4.256	4.011	4.174	A-B	.27	15.	07	×
	m (5.667	6.214	4.833	5.612	3.830	3,542	3.485	3.639	A-C	18	77	9	
	ပ	2.152	2.429	3.750	2.694	3.346	3.553	4.866	3.907	B-C	.23	30	94.	. 29
Ge in	•	767	776	Ş	Ş			,	ļ					
21d-27	(m (.327	380	306	. 338	.227	.241	.226	.225	۵-۲ ۷-۲	 05	.58	99. 92.	£ 2.
	د	. 103	5 11.	.212	.138	.169	.167	.287	.211	ာ- ရ	•39	35.	٤٢.	97.



Table XXV

Means, Standard Deviations and Correlations for the Initial Scores, the Gain Scores and Parcentage Gain Scores for Spring Tone Groups

			Means.			S	tandard	Standard Deviations	90			Corre	Correlations	
Group	c	30	B 29	2 21	Totel 80	٧	en en	ပ	Total	Var. Pair	V	æ	ر	Total
Initia	_													
Test		7.200	8.241	7.714	7.712	4.723	5.468	5.451	5.149	A-B	99.	88	78	. 78
	æ	6.767	7.838	8.000	7.475	4.125	5.562	4.680	4.802	A- C	.28	.81	.57	. 55
	ن	2.567	3,138	4.762	3.350	2.932	3.248	4.110	3.457	B-C	30	.67	۲.	.57
1	•	8	630	,										
1181	<	0.400	709.0	4.286	210.0	6.038	6.022	4.518	5.703	A-B	.51	74	59 .	.63
	œ	3,533	8.310	3.286	5.200	4.981	8.384	5.605	968.9	A-C	67.	.28	97.	.37
	C	3.000	2.897	3.857	3.188	4.136	4.039	5.686	4.517	B−C	32	90°	.50	.21
Gain														
48-pre		.163	.181	.117	.157	.157	.167	.138	.156	A-B	95.	. 78	.72	89.
	8	.085	.211	980.	.131	.126	.225	. 148	. 182	∀- €	95.	.47	٠63	.51
	C	990.	.068	o 60.	.073	.095	.097	.138	108	B-C	92.	.21	.55	٦.

Table XXVI

Variance-Covariance Matrix for Selected Group for Autumn Rhythm Study

Variance-Covariance	Matrix	for	Cain	Scores
A ST. TSINGS_COAST.TSINGS	MALLEX	101	CELII	SCOLES

		<u>Variable</u>		
Group	n	A	В	c
A	34	270.7843	235.0071	116.3102
			274.5463	206.8645
				251.6221
В	38	259.6757	166.4865	174.8328
			232.8798	241.7013
				309.9203
C	36	379.1873	289.8667	258.4381
			308.3643	289.8643
				393.6214
Total	108	306.2395	220,0419	195.8044
	•		268.7320	242.4155
				313.5835

Variance-Covariance Matrix for Percentage Gain

		(<u>Gain</u>) So 100-pre	cores	
A	34	.0495368	.0520911 .0623580	.0470510 .0524980 .0513537
В	38	.0441469	.0329606 .0367257	.0318470 .0357352 .0460255
С	36	.0569402	.0530426 .0578731	.0555111 .056234 .0665983
Total	108	.0505913	.0442912 .0510554	.0445383 .0467951 .0540267



Table XXVII

Variance-Covariance Matrix for Selected Group for Winter Interval Study

Variance-Covariance Matrix for Gain Scores

		Variable	•	
Group	n	A	В	С
A	33	10.43371	3.385417 14.66667	-1.905303 2.958333 11.19508
В	28	18.10979	7.674603 12.54497	6.608466 3.719577 12.62434
С	24	16.08696	5.565217 12.14493	11.78261 7.826087 23.67391
Total	85	17.42493	5.457563 13.24034	3.753361 4.165546 15.26246

	Variance-C	ovariance Matrix (<u>Gain</u> 100-pre	for Percentage Gain Scores	
A	30	.0513748	.0073522 .0441774	~.0017989 .0139660 .0284008
В	29	.0667110	.0357892 .05791 8 4	.0183681 .0138951 .0278155
С	21	.0716936	.0397340 .0511705	.0579854 .0471883 .0822548
Total	80	.0777477	.0241804 .0504107	.0174106 .0218072 .0444558

Table XXVIII

Variance-Covariance Matrix for Selected Group for Spring Tone Group Study

Variance-Covariance Matrix for Gain Scorea

		Varia	<u>ble</u>	
Group	n	A	В	С
A		36.45517	15.43448 24.80920	12.31034 6.551724 17.10345
В		36.26601	37.33005 70.29310	6.770936 2.068965 16.31034
С		20.41429	17.36429 31.41429	11.79286 15.89286 32.32857
Total		32.51883	24.89620 47.55443	9.478639 6.607595 20.40744
	Variance C	ovariance Matrix for	Percentage Gain	
		(Gain 100-pre) Sco	ores	
Group				

Group n A .0084099 .0047399 .0091045 .0246547 .0111122 .0159545 B .0292612 .0507899 .0279769 .0075297 .0045664 .0093565 C .0189913 .0148065 .0118823 .0219765 .0189738 Tota1 .0244149 .0192827 .0085225 .0331255 .0059575 .0115669



Table XXIX

Composite Variance-Covariance Matrices

Quarter	Vairable	n	A	В	C
Autumn	Gain (Comb)	108	303.2158	230.45343 271.93013	199.86203 246.14337 318.38793
	%Gain (Comb)	108	.0502080	.0460314 .0523189	.0448364 .0483189 .0546592
	Gain (Duple)	108	162.3249	124.3401 155.6749	106.7929 135.5637 169.3587
	%Gain (Duple)	108	.0549731	.0491474 .0554784	.0481458 .0510165 .0593448
	Gain (Triple)	108	46.68261	31.78529 42.29742	29.56973 40.73807 65.60293
	%Gein (Triple)	108	.0630677	.0527309 .0650725	.0537849 .0582271 .0912505
Winter	Gain	85	14.87682	5.54175 13.11886	5.49526 4.83467 15.83111
	% Gain	85	.0632407	.0276251 .0510888	.0248311 .0250165 .0461570
Spring	Gain	80	31.04516	23.37627 42.17220	10.29138 8.17118 21.91412
	%Gain	80	.0238743	.018933 .0295736	.0092740 .0068747 .0124783



Table XXX

Regression Coefficients for Gain Scores on Pre Scores and Groups for Autumn Rhythm Study

Variable		rre			Group			
	٧	B	၁	Α.	æ	ပ	Const.	
Duple + Triple								
Cein - A	-,882#	.276	348	2.796	-3.154	0.357	50.127	16.692
	038	-,739	4884	-1.837	2.846	-1.010	49.369	16.240
υ	.038	.169	530#	0.000	-0.763	+0.683	58.313	16.358
Danje								
V	853&#	.0973	.3868	2.065	-2.677	.612	37.418	12.382
: •	1630	-1 0386#	2694	-1.1134	1.4298	-3164	37.764	11,815
ů	.1520	7637	5898	.335	-1.370	-1,035	40.808	11.438
Triple								
•	9483#	.4292 *	. 2086	.6294	6021	0273	16.234	6.291
; #2	2131	44384	. 2438	893	1,372	479	17.724	6.146
Ü	0723	.3926	7749#	3213	.3841	0628	20.898	6.679
Duple + Triple								
Z Cein A	002871	.003947	.004295	.03847	03971	.00114	.48167	.1921
	000576	.000228	.0061704	01486	.03170	01684	.48565	. 1958
υ	000746	.002611	.002224	.01966	02476	.00510	. 57986	.2235
Duple				-63670	70030	10000	63663	07.1.0
< 1	- (033003	001804	10000	- 008851	025465	-,016614	57851	.2167
a U	.003792	002792	.004658	.026544	034069	.007525	.6416	. 2404
Triple	2011276	*172910	.006320	.028936	024570	-,004366	.41430	.2204
C ex	000043	010620	.008794	03514	6867	01466	71877	.2337
ပ	006830	.025893*	01224	.01675	.00899	02574	. 58020	. 2965

Table XXXI

Regression Coefficients for Gain Scores on Pie Scores and Groups for Salected Groups for Winter Interval Study

Desendent		Pre			Group			
Variable	*	6 0	ပ	٧	£	C)	Const.	
Gain - A 8 C	509# .120 .047	.278* 455* .452	. 230 . 5454 - ,497	2,635 -0.054 -0.578	-0.935 0.982 -0.593	-1.700* -0.929* 1.171*	8.198 5,524 1,341	3.601 3.493 3.714
% Gain A B C	004170 .005293 .003104	.018613# 002330 .022678#	.030197# 015943	. 17499	06968 .06628 03460	10531* 04673* + .07367*	.29748 .19274 .03067	. 2340 . 2093 . 1979

Table XXXII

Regresulon Coefficients for Gain Scores on Pre Scores and Groups for Spring for Spring Tone Groups Study

Dependent		÷			Croup			
Variable	V	£	ပ	V	æ	ပ	Const.	
Gefn A	-,249 ,503*	.304 849* .118	.770* 1.058* 386*	1,363 -0,922 -0,248	1.323 3.627 -0.797	-2.687* -2.705* 1.045*	2.801 3.860 -0.301	5.002 5.544 3.802
7 Gets A B	.000543	.006918 018119# .002521	.02704* 006866*	.03202 02397 00634	.03165	06367* 06775* + .02301*	.03123	.1304 .1463

DISCUSSION AND SUMMARY

The research undertaken was to determine from further analysis of past research, individual student error patterns, in order to develop work scores and classify these by method and individual characteristics. A further objective of the research was, if possible, to establish a system for diagnosing students' basic music learning ailments and predict from an existing spectrum of differential auto-instructional methods the needed treatment for a given set of individual characteristics. Finally, the research was an experiment with a group of students so that an evaluation of this clinical type instructional program could be made.

A coding system was evolved to undertake the item analysis and subsequent use of individual student error patterns and work scores. The variance in error patterns was not as great as first believed. Even though item analyses of student work offers considerable information, there was no way in which the data could be used to assist in pairing information of student work with different methods of instruction.

A surprising outcome of the initial attempt to diagnose student characteristics from standard test scores used in the School of Music was the lack of relationship of individual characteristics to the training. This is especially noteworthy since analyses of previous research had indicated usable relationships. The lack of relationship of background test scores indicates that such measurements are not critical to the specific learning tasks. It was, therefore, decided to ignore those measurements in placement and subsequent analysis. Instead, a more effective means of placing students in the individual training was on the basis of known pre scores on the training to be undertaken. Even though the data indicate that it is not extremely accurate to predict an individual score on this basis, it is important to note that there are types of individuals who as a group respond to particular types of treatment.

From the research it was possible to distinguish individuals and groups as a particular type of learning problem, which could be dealt with on an individual-group basis, with the predicted gain scores established.



It is evidents, from this research, that there is a need to pursue the individuality of students to determine their needs for specialized grouping and treatment for better learning. It appears important to pursue learning problems more from an operational procedure rather than from a background analytical analysis. It appears that what a student is when combined with an appropriate learning environment and motivation is more important than what the student was before a particular learning task was begun. There certainly are a variety of ways in which this problem can be investigated. This research, even though highly controlled, could be classified as a very small step toward larger, more sophisticated research involving computerized instruction, individual counselling and more refined methodology.

It is indeed important to realize, and this research further points out the realization, that individuals must receive specialized attention and instruction to attain the greatest benefit from an instructional or learning environment. It cannot be assumed that every individual receives the same benefit from the same instruction. The elements of individual variability and motivation make even a highly organized instructional environment different for different people. The need is to provide as much flexibility in the system utilizing modern technology and new media in order to enhance the multiple presentations of information to a variety of individuals. The teacher and student should be aware of as many possibilities as are available to meet the challenge of improved learning.



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APPENDIX A

THE ANALYSIS OF THE DIFFERENTIAL EFFECTS OF SIX EXPERIMENTAL TREATMENTS
FOR THREE BASIC MUSIC ELEMENTS INVESTIGATED IN THE FIRST PHASE OF A
GRANT SUPPORTED BY THE U.S. DEPARTMENT OF HEALTH, EDUCATION AND
WELFARE, OFFICE OF EDUCATION UNDER TITLE VII 85-864
GRANT NUMBER 7-45-0430-214, A COMPARISON BETWEEN
DIFFERENT STIMULI COMBINED WITH TWO METHODS
FOR PROVIDING KNCWLEDGE OF RESULTS
IN MUSIC INSTRUCTION



SUPPORTING DATA FROM PHASE I, OFFICE OF EDUCATION GRANT NUMBER 7-45-0430-214 WHICH RELATES TO THIS RESEARCH

In Tables I, II, and III the following can be observed:

- (1) part number 1 in each Table, there was a significant improvement in the scores of all of the subjects. These pretest and posttest mean scores are shown in number 6;
- (2) part number 2, other factors (individuals differences) were significant at the 1 per cent level;
- (3) part number 3 and part number 7, there were significant differential effects for the experimental groups of the various auto-instructional music methods.

It is important to know, however, that if all students would have achieved optimal learning the posttest means under number 7 would read:

Table I 182

Tablo II 72

Table III 108.



Table I

Total Scores Phase I, OE Grant Number 7-45-0430-214 Ohio State Research Foundation Number 1677 Basic Music Element, Rhythm Number of Subjects = 95 (F Significant at the 5 per cent level indicated by *, 1 per cent by **)

	Source			Sum o	e s (rees of S edom	Mean Square	F
1.	Grand Mean of Posttest-Pretes	t Dirfe	rences	945,40	5.57	1 945	,405.57	915.55%
2.	Fall Quarter Fundamentals of	Music S	ection	3,83	2.73	3 1,	277.58	1.24
	Other Factors			95,97	2.33	16 5	,998.21	5.81**
3.	Treatment of Fall Quarter Exp Groups	eriment	al					
	a. (Column)			1,22	5.95	1 1,	,225.95	1.19
	b. (Row)			1,48	6.99	2	743.50	.72
	c. Interaction			15	8.54	2	79.27	.08
4.	Residuals			72,28	1.89	70 1,	,032.60	
5.	Total		1	,120,36	3.00	95		
6.	Means and Differences between	Means						
	Fall Quarter Treatment Group	1	2	3	4	5	6	Total
	Number of Students	16	17	17	15	15	15	95
	Pretest Mean	48.9	58.5	74.7	43.1	44.5	52.8	54.2
	Posttest Mean	154.3	142.3	159.8	160.0	154.8	153.5	154.0
	Differences	105.4	83.8	85.1	116.9	110.3	100.7	99.8
7.	Differences between Groups du	e to Ex	p erime n	tal Tre	atment			
	Treatment Group	2	3	5	6	1	4	,
	Number of Students	17	17	15	15	16	15	
	Adjusted Hean	0.0	6.6	11.7	12.9	13.7	18.9	

Table II

Total Scores Phase I, OE Grant Number 7-45-0430-214 Ohio State Research Foundation Number 1677 Basic Music Element, Intervals Number of Subjects = 83 (F Significant at the 5 per cent level indicated by *, 1 per cent by **)

	Source			Sum of Square	s o	rees t E So edom	lean quare	F
1.	Grand Mean of Posttest-Pretest Di	fference	18	50,533.	78	1 50,5	33.78	427.20*
2.	Fall Quarter Experimental Treatmen	nt		81.	26	5	16.25	.14
	Winter Quarter Fundamentals of Mu	sic Sect	ion	426.	78 :	3 1	42.26	1.20
	Other Factors			5,272.	65 19) 2	277.51	2.35*
3.	Treatment of Winter Quarter Exper Groups	imental						
	a. (Column)			52.	:	L	52.12	.44
	b. (Row)			1,042.	69 2	2 5	21.34	4.41*
	c. Interaction			114.	07 2	2	57.04	.48
4.	Residuals			5,914.	65 50) 1	18.29	
5.	Total		6	3,438.	00 83			
6.	Means and Differences between Mean	ns of Te	st Sco	res				
	Winter Quarter Treatment Group	1	2	3	4	5	6	Total
	Number of Students	15	14	13	14	14	13	83
	Pretest Mean	41.8	45.2	34.8	39.3	40.7	29.7	38.8
	Posttest Meau.	69.5	61.6	61.7	68.5	60.7	57.6	63.5
	Difference	27.7	16.4	26.9	29.2	20.0	27.9	24.7
7.	Differences between Means due to E	Experime	ntal 1	re at me	nt of	Winter	Quar	ter Group
	Treatment Group	2	5	3	6	4	1	·
	Number of Students	14	14	13	13	14	15	
	Adjusted Mean	0.0	4.9	10.5	12.2	12.3	13.7	

Table III

Total Scores Phase I, CE Grant Nu ber 7-45-0430-214 Ohio State Research Foundation Number 16/7 Basic Music Element, Tone Group Number of Subjects = 69 (F Significant at the 5 per cent level indicated by *, 1 per cent by **)

	Source		_	um of uares	Degree of Freedo	S	Mean quare	F
1.	Grand Mean of Posttest-Pretest Dif	ference	4	1,441.	75 1	41,4	41.75	121.07**
2.	Fall Quarter Rhythma Scores			188.	3C 2	(94.15	.28
	Winter Quarter Interval Scores		4	4,107.	39 4	1,0	26.85	3.00*
	Spring Quarter Fundamentals of Mus	ic Sect	lon é	4,309.	13 3	1,4	36.3 8	4.20*
	Other Factors		1	9,449.	71 19	1,0	23.67	2.99
3.	Treatment of Spring Quarter Experi Groups	imental						
	a. (Column)			331.	80 1	3	31.80	.97
	b, (Row)			2,990.	84 2	1,4	95 .42	4.37*
	c. Interaction			31.	58 2		15.79	.05
4.	Residuals		1	1,980.	50 35	3	42.30	
5.	Total		8	4,831.	00 69			
6.	Means and Differences between Mean	ns of Te	st Sco	res				
	Spring Quarter Treatment Group	1	2	3	4	5	6	Total
	Number of Students	11	12	11	11	12	12	69
	Pretest Mean	17.9	29.0	21.9	42.6	17.2	25.1	25.5
	Posttest Mean	42.7	46.5	43.0	72.2	47.7	48.9	50.0
	Difference	24.8	17.5	21.1	29.6	30.5	23.8	24.5
7.	Difference between Means due to E	xperimen	tal Tr	reatmet	at of S	pring	Quart	e r Gr oups
	Treatment Group	3	6	2	5	1	4	
	Number of Students	11	12	12	12	11	11	
	Adjusted Means	0.0	7.9	12.6	16.4	24.4	30.4	

Adjusted means not underlined or connected by the same line are significantly different at the 5 per cent level.



APPENDIX B

ITEM ANALYSIS CODE AND PROCEDURES



For each type of training, it was desirable to know the most common sources of error and the most common erroneous responses. Therefore, the first carcise attempted by each student for each level of difficulty was examined in order that errors might be tabulated.

Rhythm Item Analysis Code

For analysis of rhythm errors, a code was devised by which numbers were assigned for: (1) each one-beat rhythmic pattern; (2) to indicate that no answer was attempted, and (3) to indicate a "nonsense" response (a nonsense response was designated as one other than the rhythms used).

Duple Rhythm Code

ERIC Foundation by ERIC

Triple Rhythm Code

$$3 = \int_{a}^{3}$$

4 =
$$\int_{3}^{3}$$

CHYTHE - ITE. ANALYSIS

														36	159	
90											ğ	(20)		35	179	
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9, 60		15	551								3	(22)	l	33	621	
:92		77	1441								9	(35)] _	32	195	
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	İ	_	├-	-	-		F	=	1	 	Γ-	1		53	125	
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STO	SWN			20					S					17	231	

Item analysis sheets were used in which a vertical column was provided for each 3-beat rhythm; and a horizontal space was provided for each appearance of this rhythm in each exercise. For each student response there was an appropriate space in which to code the student's response. The information was further compiled with one master analysis sheet.

Interval Item Analysis Code

Interval item analysis sheets were prepared on which could be recorded, for each student, how often an interval had been incorrectly identified in each exercise in which it appeared. The following code was used:

Interval Code	Interval Code
Perfect Prime - PP	Perfect fifth - P5
Minor second2	Minor sixth6
Major second - +2	Major sixth - +6
Minor third3	Minor seventh7
Major third - +3	Major seventh - +7
Perfect fourth - P4	Perfect octave - P*
Tritone - T	

Tone Group Item Analysis Code

Each tone group involves two intervals and one of four rhythm patterns. It was possible to use the same code number for each rhythm previously used during the rhythm portion of the study.



88 EXERCISE 3 METHOD OF TRAINING CLASS Z ð **B**3 Z STUDENT NUMBER STUDENT NAME No answer Nonsense Answer

TAPES: TGB 10, 30, 50, 60 YEAR: **5**4 43 ITEM ANALYSIS - TONE GROUPS CLASS MODE 7 STUDENT NUMBER 4 2 2 2 2



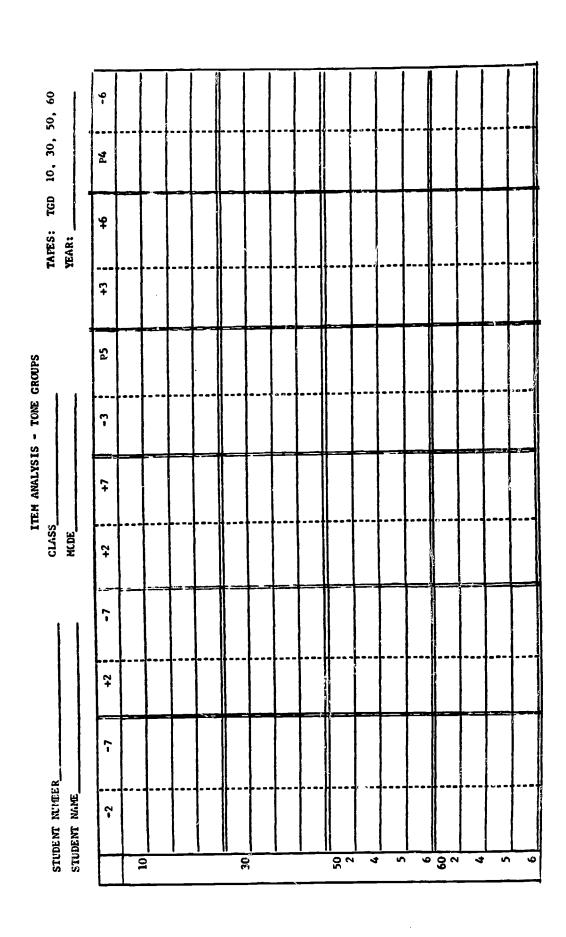
TAPES: Tub 20, 40, 70, 80
YEAR: • Z ITEM ANALYSIS - TONE GROUPS CLASS MODE_ Ţ **5**d Ţ Ţ ۳ Ţ STUDENT NUMBER 7 20 40 80

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۳-TAPES: TGC 10, 30, 50, 60
YEAR: Z **7**₫ +3 Ţ ITEM ANALYSIS - TONE GROUPS ۳ 7 CLASS 7 7 7 STUDENT NUMBER -5 2 90

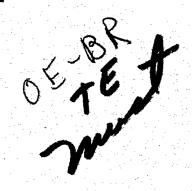
+3 TAFES: TGC 20, 40, 70, 80 YEAR: H Ŧ **b**4 4 ITEM ANALYSIS - TONE GROUPS Ę. 7 CLASS Ŧ 캺 ÷ STUDENT NUMBER +5 9



TAFES: TGD 20, 40, 70, 80
YEAR: q 7 PS ITEM ANALYSIS - TONE GROUPS 13 CLASS +3 ç 9-STUDENT NUMBER +5 20 9 Triple Code Number 2 = Duple Code Number 5 = Duple Code Number 6 = Nonsense = 9

The same interval abbreviations were employed as shown in the interval study. Item analysis sheets were prepared in which a vertical double-column was provided for each combination of two intervals used in the exercises. For the exercises in the first half of the training, a horizontal space was provided for each appearance of this combination in each exercise. For exercises in the second half of the training, a horizontal space was provided for the one appearance of this combination with each of the four possible rhythms in each exercise. For each item and response, there was an appropriate space for that particular combination of intervals and rhythm pattern.

The information was further compiled with one chart for each mode of training indicating frequency and types of errors.



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